

WAYNE O. KESTER
Brigadier General, USAF, (VC)Ret.
Route 1, 14th Crest Circle
Golden, Colorado

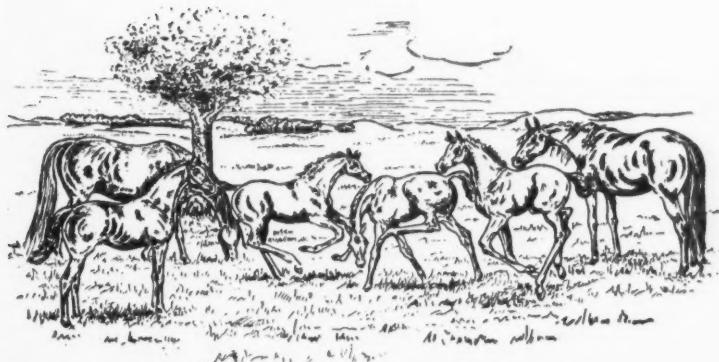
Proceedings

of the

Fourth Annual American Association of Equine Practitioners Convention

Chicago, Illinois

DECEMBER, 1958



Proceedings
of the
Fourth Annual
American Association
of
Equine Practitioners
Convention

Held at
LA SALLE HOTEL
Chicago, Ill.

December 15 thru 16
1958

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ACKNOWLEDGEMENT

Dr. Jordan Woodcock of Rye, New York, graciously accepted the position of Program Chairman and fulfilled it in an admirable manner.

FOREWARD

This is the third proceedings book of the American Association of Equine Practitioners covering scientific papers and open forum addresses presented before the Association at the fourth annual convention held in Chicago, Illinois, December 15 and 16, 1958.

The entire proceedings of this convention were professionally transcribed including the business sessions and are a matter of record. This booklet is confined to the scientific papers and Open Forum for purposes of brevity and economy.

Doctor R. E. Rebrassier, President of the American Veterinary Medical Association and Chairman of the Department of Parasitology of the College of Veterinary Medicine, Ohio State University, delivered the major address at the annual banquet on the evening of December the fifteenth during the convention.

Dr. Fred J. Kingma, of the Food and Drug Administration presented an excellent discussion developed from beautiful slides of organizational charts on "Some Aspects of Food and Drug Administration Activities Which Are Important to You." Technical difficulties prevented reproduction in print.

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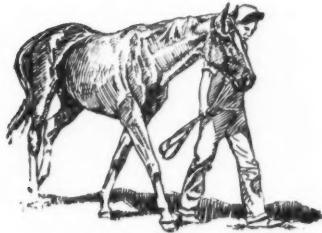
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BANQUET ADDRESS TO AMERICAN ASSOCIATION OF EQUINE PRACTITIONERS

DR. R. E. REBRASSIER, *President of A.V.M.A.*

The story of how man developed the horse from a wild, untamed animal to its present high degree of usefulness is an intriguing one. Down through the ages the horse has been not only a close companion to man, but one of the most useful animals in the advance of civilization.

It has been said that the American wilderness could not have been settled without the horse and that the winning of the West was virtually accomplished on horseback. The horse is an animal, which from the earliest ages of the world, has been destined to the pleasure and service of man. Indeed the horse has been part and parcel of America's whole colorful history. Each breed has contributed its part to our heritage of great racers, trotters, riding horses, carriage teams, show horses, cow ponies, calvary mounts, and plain utilitarian horses of all kinds.

Among all animals there is none so deserving of our interest and affection as the horse. It is one of the most perfect machines for swift running that exists among living animals and is perhaps the finest example of what nature has been able to accomplish in adopting a quadruped to speed over long distances.

Veterinary medicine came into being because of man's concern for animals; because they produced food and power, and because they afforded companionship and pleasure. The horse affords power, companionship and pleasure.

Pioneer work in veterinary medicine and surgery was accomplished with the horse, and the early contributions were the very foundation upon which our profession has builded.

A historical fact, presented by Dr. Clifford Eby of Washington State College, indicates the tremendous influence the horse has had upon our profession. The death of Eclipse in 1789, because of neglect and improper attention, aroused the nobility and they caused the establishment of a school comparable with other fields of medicine.

It was unfortunate that the profession became panicky when the automobile came into being. It was necessary, of course, to make adjustments, but we became too drastic in our reaction. We made changes in curriculum and failed to explore the possibilities of equine practice. Many went so far as to discourage young men from entering the profession.

The revival of equine practice is of extreme importance to our profession and it is rapidly becoming one of its strong segments. It is a type of service that can be accomplished on a high level, comparable to that of small animal practice. One indication that the profession recognizes the value of equine practice is the selection of Julius Neal by the North Carolina V. M. A. as the "Veterinarian of the Year". Dr. Neal is a specialist in diagnosis and treatment of equine lameness.

The organization of the American Association of Equine Practitioners was one of the best things that could happen to equine veterinary medicine. It made possible such meetings as this one tonight, which enables those engaged in this specialty to discuss mutual problems peculiar to the industry. Our national and state associations have more or less neglected equine practice on their programs but this is now gradually changing.

Your association has made real progress since its organization in 1955. I understand that you have over 200 members and the attendance at your meetings has shown a marked increase.

I understand that the two primary objectives of the association are to disseminate information to members and to improve relations with the racing industry. Progress is being made in this endeavor and it should have the support of the entire profession.

Some of the problems in equine practice have been with us for a long time and some are relatively new. Fortunately, considerable progress is being made to solve those problems. Parasites have been one of the major problems on all breeding farms. Recently, products have been developed that permits a change from curative practice to that of prevention. An anthelmintic has been developed that is the first to have broad spectrum activity in the horse. I have reference to the newly developed piperazine-carbon disulfide which attacks the major gastro-intestinal parasites with the exception of the tape-worm. It removes more parasites than other preparations and is less toxic to the animal. It is effective in all breeds, from one month to many years of age. This is just one example of the progress made in developing material to aid in combatting equine problems.

Looking forward to the future of equine practice, I believe our national, state and local associations, also the schools of veterinary medicine have a vital responsibility in promoting this phase of veterinary medicine. The American Veterinary Medical Association should assume the leadership in promoting equine practice. It should insist on adequate programming at the annual conventions and should encourage the constituent associations to consider this phase of veterinary medicine in planning their annual programs.

The American Veterinary Medical Association, through its Council on Education should insist that the schools of veterinary medicine provide adequate instruction in equine diseases. Most schools of veterinary medicine do not use the horse as a pattern in anatomy but utilize either the dog or cow. As previously stated, our schools were too hasty in revising their curriculum as it affected the horse. We should not over-emphasize this phase of veterinary medicine but should recognize its potentialities and train our undergraduates so that they are capable to practice this facet of our profession.

I believe that one of our major tasks relative to instruction in equine conditions is to change the attitude of the members of the faculties in our schools. It has been my privilege to visit all schools of veterinary medicine in the United States and Canada as a member of the Council on Education. I have been especially interested in curriculum and the attitude of the faculty relative to areas such as public health, regulatory activities, equine practice and areas other than private clinical practice with small animals and livestock.

Tradition has influenced the type of teaching in our veterinary schools and the emphasis has been put on training the student for clinical practice with livestock and small animals. Most of our schools have not adopted their curriculum to the expanding service of veterinary medicine, but the time has arrived when, of necessity, we must train our undergraduates to meet the challenges of the diversity of service demanded by the public; these challenges include the area of equine practice which must be given its rightful place in the profession of veterinary medicine.

It is my hope that the progress being made in equine practice be continued and that this area of veterinary medicine will be considered as one of the important facets of the profession.

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EQUINE TRACHEOBRONCHITIS: MICROBIOLOGICAL AND CLINICAL ASPECTS

A PANEL DISCUSSION

M. B. TEIGLAND, D.V.M.

J. P. ROSBOROUGH, D.V.M.

V. SAURINO, Ph.D.

DR. M. B. TEIGLAND: Since I am the oldest of the group, I will introduce this little panel.

The way interest in this particular aspect of equine tracheobronchitis came about—and that is probably a misnomer, and probably should include upper respiratory infections because I do not think any of us are too sure about localized infections in some of the coughing horses—the Reineman Stable came to me last year and asked if I would culture some throats on some coughing horses. This offered a challenge to me. Dr. Rosborough had done this on some horses in Chicago that had been through quite a course of treatment, until he had done this.

So, I proceeded to see if we could do the same thing. After maneuvering around, we finally got some cultures, and we did get some pure cultures. We found that these organisms do respond to the drug of choice on sensitivity plates, in many cases.

I would like to mention that the work that I have been able to do in Miami has been through the gracious help of Dr. Saurino who has done this on his own. It was not done under any research grant or anything. It has been through Dr. Saurino's willingness to help veterinary medicine. We are greatly appreciative of this chap that we have in our midst.

I would now like to turn it over to Dr. Rosborough to have him tell about the first experiences he had with culturing in these horses in Chicago.

DR. J. P. ROSBOROUGH: We were not exactly satisfied with our shotgun techniques of going on for two or three days with this and then two or three days with that, and these horses continued to cough. I am sure we have all seen horses that did not respond to this, that or the other antibiotic. It seemed to behoove us to try to get this thing pinpointed a little bit better. This trainer became fairly insistent, and that sort of precipitated our work.

In the light of Dr. Teigland's advancement, as far as technique is concerned, our technique was pretty much of a barnyard approach. We went down in the barn and used the mouth speculum on these animals. We would tie the tongue down and, with the aid of a headlight, attempt to place a swab somewhere in the posterior area of the pharynx. Frequently this would elicit a cough, so that we were probably back a little farther.

These swabs were then sent to the laboratory. Based on the *in vitro* results of the laboratory, we would choose an antibiotic that we felt the horse would tolerate well and one that was economical. Both of these factors played a part in the choice of the antibiotic.

The animals were treated for seven days. In this particular group I think there were four, five or six, somewhere in that area. The organism was extremely sensitive to dihydrostreptomycin. We kept them on it for seven days. About the third day the cough seemed to subside, and by the fourth day that was the end of it. This does not seem very important, economically but when you get a horse just ready to run, right on top of a race, there is a lot of pressure brought to bear on you to try to get this thing solved in the best way possible.

An intriguing thing happened to these horses, and I think Dr. Teigland will mention it later. One organism showed up as a predominant organism, reported as predominant and secondary, and they were treated here. When these same horses got to Florida, the bacterial picture was a complete reversal. I think Dr. Saurino will explain that to you.

That is really about all I have to say, as far as the impetus behind this:

DR. TEIGLAND: I think probably the next thing we will do is to get you familiar with how this thing took place. We will pass these tubes around. These are disposable tubes, made of plastic. One problem we had was in securing plastics that were snug enough together where you passed this first cannula through the nostril, as you would a stomach tube. There were several factors. First of all, how much gross contamination you get through the opening of the thing, as you go up. Secondly, how do you sterilize this?

These come in sealed bags, and we will pass some that are in bags. Those that are in bags, do not open them, as we will try to reserve them for use. Those that are open, there are three tubes, one within the other. If you take the second tube and push, there is a flap on the end of the first one to protect your instrument as it goes to the back of the throat. You push the first one, and it snaps open. When you get to the back of the throat, you open this flap; then the third one has a swab, and you push the swab to the

back of the throat. Oftentimes this hits the epiglottis, and you get a cough, and you see quite a discharge on the end of the swab. We all recognize that there are probably many entities as to the initial cause. I am not forgetting the fact that we have viral entities. We have done no viral work at all, due to the expensive process that it would be to isolate any virus. We have done strictly bacteriological examination. However, in many of these cases we will discuss, we will show where the bacteriological phase is quite important.

After this swab has touched the throat of one of the really severe sore-throated horses, that will hardly eat, we oftentimes find that the swab is covered with blood. I assume this is because the throat is so raw. On endoscopic examination you have seen hemorrhages in the back of the throat. Normally we never see this blood. I am sure this blood is not produced by the instrument.

You withdraw the swab back into the tube, where it is protected. Then you just pull the thing back. Throw the outer tube down, take sterile scissors, cut the outer tube down here where you have no contamination; open the test tube in which you have culture media. Merely push the third tube down; push the swab on into the vial, and then just merely cut it off. It is all sterile in this area, except the tip that has been in the back of the throat. This is carried in the car and allowed to grow in the media until it gets to the laboratory.

Obviously, if the horse is real sick, we go ahead and initiate treatment, gunshot-wise or otherwise. If we find this organism is different than its sensitivity, and if the drug of choice happens to be a drug that I consider safe in the horse, we go ahead and employ this drug.

Somebody asked me the question, "What if this drug is one of the drugs that produces diarrhea?" I did not think of it but there is a saying if he gets diarrhea, he is afraid to cough. [Laughter] Maybe that will work, too.

At this time I would like to turn it over to Dr. Saurino to tell about some of the work that he did. I think, as he does through this, we will run it back and forth and discuss both phases of it as to what we found in these various groups of infections and what results we had with treatment. Dr. Saurino!

DR. V. SAURINO: I think it is wise first to speak of the normals, although we did not take normal cultures first. In a group of seven horses, swabs were taken mainly by the method you have in hand, also a method where we merely would swab out the nostrils, where you catch the exudate. We found a great variety of organisms present.

The only difference I can see in bacteria of the horse mucous

membranes and those of human is that, in a general way, we find more of the Actinomycetales on the horse mucous membrane.

It was surprising to me how pure the cultures came by the swab technique. We found, generally, in normal horses Staphylococci, some of the Gram-negative, a number of Aerobacter or coliform organism; from the hay, some yeasts. In only one horse did we find a hemolytic streptococcus and Pseudomonas combination. This was in a clinically normal horse. We will talk about this horse after a bit because it was at this stable where we encountered our first real bottle-neck.

As the work progressed bacteriologically, I would like to divide the groups we studied into two major groups. The stable already mentioned was the Reineman stable. We had a group of seven horses. These horses were cultured first last January. It was rather strange that every single one of these horses, clinically sick animals, plated beta hemolytic streptococcus with Pseudomonas. In running disc sensitivities the only drug of choice, although we ran perhaps fourteen or fifteen antibiotic discs against these organisms, was furadantin.

I will leave the therapy and all the clinical signs and symptoms to Dr. Teigland.

We were overjoyed with this. We thought we had it made, until we got into group 2. The one normal horse that we found the streptococcus and Pseudomonas in was a member of the group 2 stable. It happened that a cold epidemic broke out at this stable. As a matter of fact, my own horse, or my son's horse was very intimately involved in this. We felt we had this cinched. We went right down and took cultures of these horses and proceeded right away to treat with furadantin. Lo and behold, instead of getting nice clear zones, if I could use the blackboard [blackboard] this is the sensitivity disc; up to this time we would have nice, large, wide zones around the furadantin disc. This time, in eight hours, the disc formed beautifully, looked like we were right on the same track. However, the growth was rampant. These organisms would grow very rapidly and take over the whole thing. Gradually, in twelve, eighteen to twenty-four hours, secondary colonies would begin to appear in here, scatter throughout the zone of primary inhibition. Around the periphery of the original zone we would get a very thick growth and pigment formation of this Pseudomonas, which indicates to me that maybe we have now a strain of Pseudomonas which is furadantin-dependent, and that at a certain concentration, at a very weak concentration, these organisms will use furadantin as one of the substrates. This began to worry us. Sure enough, when we started to treat with furadantin, the results were not the same. So, we began to look for other reactions.

We found that, using other antibiotics, we could do something about this problem. With the Waverley horses we ran into the same

type of business. It seem to us at this time that we are dealing with two types of *Pseudomonas* infection: one very sensitive to furadantin, and one not at all as susceptible to furadantin. We are being urged now to look for some other mechanism of treatment with this type of strain.

For the swab, the cultures are beautiful. They are clear; they are clean. We have never had a contaminant except in one instance. We can depend on the flora from the swab being exactly the flora that is in that horse's throat. I think this gives us a mechanism of doing a very scientific approach to this type of animal medicine. If nothing else, I feel we have accomplished this.

As to the etiologic agents in this disease, we do not know yet. It still is in the realm of experimentation.

DR. TEIGLAND: We will review what happened in these two groups of horses mentioned. In this one group of horses, which we will call group 1, there were seven horses involved with typical race track cough.

As I have said before and will repeat, possible viral entity is of great importance, and I am not disallowing this. However, clinically, it is hard to tell the owner, "Well, this is probably a virus, but we don't have anything to do with viruses because we do not know how to treat them." You have to go on some basis for treatment.

This first group of horses we put on furadantin. This furadantin was not an available drug and the Eaton Laboratories was kind enough to send some to me by airmail, to get these horses started on it. The dosage we used on test was 900 mg. every eight hours, and continued this for three days.

This particular stable had what was known as the "snotty nose." At the end of the three days, most of these were receding considerably. However, there was an occasional fever break in these horses. Whenever the fever break occurred, I found that furadantin did not control the fever. Whether it is not the same organism that is in the throat, causing this fever, or what it is, I do not know. We have never had any real difficulty in controlling the fever by going to one of the second drugs of choice, which might be terramycin or tetracycline, giving 10 Gm. intravenously, and the following day going back to furadantin, as soon as the thing came under control.

The first group responded quite well. At the end of three days, we discontinued treatment. This apparently was a mistake. In eight days the whole stable broke out again with the same thing.

We recultured the horses. They had not developed any resistance to furadantin. We put them back on furadantin, 900 mg. three times a day, for six days. At the end of six days, these horses

were well, and remained well. Incidentally, the horses raced real well. No horse ever seemed to get the so-called knocked-out reaction that we often hear from our trainers, when they blame the drug and do not consider the infection. They usually wind up saying, "Doc, don't use this, don't use that. We have had bad experience." I am sure this is true of many drugs. I am sure we have to consider the angle as to how long we want to use this, and select the horses in which we want to use it.

The second group of horses were cold-blooded horses in general, except for the one horse of Dr. Saurino's boy, which was a Thoroughbred. This horse's infection was so severe that, on the first call, his blood count had dropped to below three million. I do not know what it was two weeks before. Dr. Saurino told me that maybe he was an anemic individual, it was conceivable the toxins of these organisms produced this anemia. The horse was extremely jaundiced. We often see this jaundice with a cough break on the track.

This horse gradually returned to normal; has been recultured as late as last week. Though he has been normal for three weeks, clinically, physically, everything about him, he still contains these organisms in his throat. What this means, I am not prepared to say.

The rest of the horses in this stable were mostly cold-blooded show horses of one type or another. The interesting thing about these horses is that, without failure, every one of them developed abscesses of the various submaxillary glands and the various glands throughout the entire face. They would get the typical strangles abscesses which I have never seen in Thoroughbreds on the race tracks. I assumed this was just a furtherance of the Streptococcus or Pseudomonas. We did lance some of the abscesses, and some the abscesses burst by themselves. In all cases where we cultured these abscesses, they were all Staphylococcus. Every abscess we cultured in this strangles syndrome has been Staphylococcus. What this means, I do not know. I have not seen this type of thing on the race track.

This was the toughest respiratory infection in this group of horses that I have ever seen. It did not seem that anything would help them too much.

The other group of horses was an old one here and there. Last year, when I came to this meeting, I left a horse down there that had a green discharge that had existed for three or four weeks. The chap that owned the horse said, "I want you to give this horse penicillin for five days, because I have had previous experience that, if you give penicillin for so many days, this discharge will dry up."

I proceeded to do so. He was probably running about twice as much at the end of the five days of penicillin as before we started.

That did not concern me too much. I said, "You had better leave him in the stall." It was awfully cold in Miami last year. When I came back to Miami, the horse was standing in the stall with pneumonia. Proceeded to treat the horse with terramycin and fluid, and maintained him on triple sulfa compound. This means the horse had had penicillin, terramycin and triple sulfa. He had been through a pretty good course of treatment. The pneumonia responded fine. In four days the horse was over the pneumonia, but the discharge and coughing persisted. It was getting more and more chronic.

We cultured this horse, and it was just straight *Pseudomonas* infection. With furadantin for three days, the horse was dried up, and it remained so. This was one we kept on furadantin for six days. The furadantin picked up the *Pseudomonas*. I was taught in school that *Pseudomonas* is not a pathogen. In my experience, it has to be considered as such, at least in this work.

At another farm there was a horse that had been shipped down from Virginia. It had coughed four and one-half months and had a considerable amount of coughing from time to time, and apparently had not responded to treatment. I do not know what treatment he had had, or much if any treatment at all.

This particular individual had only one organism, straight *Pseudomonas*. I did not know whether this was the organism involved or not. He had very little discharge. This organism would respond to neomycin or streptomycin. I selected streptomycin, which I gave five days at the rate of 5 Gm. twice a day. It went back to show business.

There was another horse that came from Ireland and coughed for one month. Then there was a horse the owner picked up in this country that had coughed for four and one-half months.

I cultured the two horses, and handed the culture tube to the assistant but had not marked the tube. He put it in his pocket. As I took the second, I went to tell him to hold on so I could mark it. When I looked up, they were both in the same pocket. I said, "Now we are in a real kettle of fish. We will hope they are the same thing."

They were not the same thing. It happened that the drug of choice was furadantin. Dr. Saurino said, "You are going to have a tough time with the one horse." I guessed which horse. I said, "The horse that has had it for fourth and one-half months." In three days this horse was well. The other was coughing at the end of six days of furadantin. We again cultured and, sure enough, the horse that coughed for six days has a resistant bug. As far as I know, he is still coughing.

So I was impressed with the thought that possibly this might even help on prognosis.

Dr. Saurino, do you have any more you want to discuss before we open it to discussion?

DR. SAURINO: If you will recall, we spoke of the group 1 series that were all sensitive to furadantin. We recultured each of these animals about a month later. In only two instances did we see a very few Streptococci and a few Pseudomonas. All of the others had completely cleared up. Their throats were back to what you might call normal. Of course, on a clinical basis, they are all normal.

In the second series that have resistant Pseudomonas, as far as we have gone, five of the eight horses we have recultured still have the Streptococcus and the Pseudomonas on their mucous membranes.

I have the feeling that the general condition that we recognize as the runny nose, the cough, the bronchitis, tracheitis, pharyngitis, and that type of thing, is really the result of the action of both of these organisms, because, on plate, once you separate them, nine to one they are as hemolytic as the sum and substance of both.

I have the feeling that the severe hemolytic response and the severe toxemia are a result of both of these organisms living symbiotically. Every time we disrupt the existence of one or the other, we have a good chance of clearing up the infection.

DR. TEIGLAND: Dr. Rosborough!

DR. ROSBOROUGH: One thing we found is that, in general, the same organisms are present in the same group of horses in the same location. In other words, you will not hit Pseudomonas in one horse in Joe's string; you will hit all hemolytic Streptococcus with Staphylococcus secondary. There is a uniformity within the barn.

Last summer we got so that we were cheating a little bit, maybe, on the cultures. We would take two or three out of the group and then treat all the coughers simultaneously. This is not scientifically accurate but it has economic features to it that are kind of appealing to the people who are paying the bills.

We think this is just an idea, and I think Dr. Saurino will agree that is the way we are presenting it, as simply an idea to be tried, and an idea that we hope is useful. The whole technique may be of no value in other types, but I think in our hands it has been reasonably useful. It would be economically sensible if you got even 50 to 75 per cent of these coughers back into the active area. When they are dead fit that, of course, is where the trainers want them.

DR. TEIGLAND: I would like to mention one other adaption of this instrument. We have tried taking cervical cultures in mares. It is hard to be sure, when you come back out, that you have

not something out of the air or something off the side of the vagina farther back. Contaminants are always hard to rule out.

We are going to devise a tube that is stiff, where the outer cannula is stiff, and it will be about 24 inches long. You can go directly to the cervix with this instrument. There will be the same type of protection, only possibly the entire plastic bag will be introduced, and you merely pull the plastic bag off as you enter into the cervix. This instrument is not available. The plastic materials are en route, and these things will probably be available by the time I get back.

I think it is probably a good adaptation of the same idea, for taking cervical cultures, and feeling there is no contamination, unless there was something already existing in the cervix or the uterus.

I think probably it is time to throw the thing open. Any questions or does anybody have any suggestions?

QUESTION: Will these plastic tubes be available commercially?

DR. TEIGLAND: A company in Miami is making them for us. One of the big problems has been the cost of this instrument. They have figured the thing out pretty closely. An instrument of this type is going to cost \$1. The fellow who is going to distribute them is Walter May, and his address is 743 Northwest 41st Street, Miami, Florida. This chap has been doing some equipment building. He built a bunch of cabinets out of formica and steel. He is interested in getting some work with veterinary medicine. He has done some beautiful work and probably will get into more refinements which might be of value to us.

It is difficult to get any company or anybody interested in anything as small as this. American Hospital Subsidiary is making this, and they are wondering how many hundreds of thousands we can use.

The way they will be packaged will be in a cardboard round tube that is long enough to contain this instrument and the cervical tip for doing uterine work. They will be packed one dozen to the box. The only way I know how to handle it would be either to send a check or ask that they be sent C. O. D. He is going to have to order them from American Hospital and then redistribute them. I think if you did not send the money with the order, he would send them C. O. D. That was my understanding of the way he would distribute them.

DR. SMITH: In passing this in, how do you use it?

DR. TEIGLAND: No trouble at all. You pass it the same as a stomach tube. The whole procedure probably takes one minute. It is very quick, as quick as drawing a blood sample.

DR. O'DEA: What was the throat culture?

DR. SAURINO: The swab was placed in 1 cc. of Todd-Hewitt or the common brain-heart infusion broth. I would like to recommend that you get those broths to the laboratory as quickly as possible. I have had some trouble in the past where, if they are kept warm too long, the *Pseudomonas* would outgrow the *Streptococcus*. So, the sooner they can get to the laboratory, I think the better the chances are of finding the specific organisms that are there.

Also, I may say I would be happy to help any of you if you do not mind putting them on a plane and getting them to me quickly. I am at the School of Medicine at the University of Miami.

DR. PESSION: Where do you grow them in the laboratory?

DR. SAURINO: From the swab we take. I feel the most vital thing is to get the results to the veterinarian as quickly as possible. So, we do a gross culture for the discs immediately. We use two blood plates. One we streak for isolation and one we streak for discs. Take the swab, and I just touch it to one area of the plate, and then streak for isolation; in other words, dilute them by spreading, to see if we can get single colonies which we can pick for purity and identify for any subsequent subculture work.

The rest of the swab, I just streak all of the entire surface of the plate, place the discs in sort of semi-circular fashion, whatever discs I will want to test against. Then, where sensitivity is established, you have a zone of inhibition. These plates are just classic. Once you see one, you recognize them forevermore. You can hold them up to the light and tell where no hemolysis has occurred, just by glancing through the media. You can spot and identify your organisms in this fashion.

In subsequent subculture work, by the way, we sent the streptococcus to the C. D. O.; it is a group C Streptococcus and probably the equine group C Streptococcus. The *Pseudomonas* we have identified in our own laboratory.

DR. ROSBOROUGH: The very fact that Dr. Saurino is willing to do this may give us a central laboratory where we will not get a variance of opinion as to whether this organism is sensitive to such-and-such, and so on. Certainly, the very fact that he is willing to do this would give us a uniformity of results. I think we would all be interested in that, either to prove or disprove this general approach to the coughing problem.

DR. TEIGLAND: There would have to be some minimal charge to pay for the equipment at least. What would the charge have to be?

DR. SAURINO: Probably \$2.

DR. NEAL G. MENDELSON [Toronto, Can.]: By rapid calculation, furadantin would cost somewhere between \$125 and \$150 to treat a horse for six days.

DR. TEIGLAND: When Eaton Laboratories sent it, I did not get a bill with it. Dr. Short is here from Eaton.

DR. SHORT: I calculate if you had 100 mg. tablets, which is the only form in which it is currently available, it will cost you, at the veterinarian's level, about \$7.80 a day. We put it out in this form for Dr. Teigland's use. It is still in the experimental stage, as far as we are concerned. But we hope to be able to do something about that in the future. We cannot make any promises.

DR. T. N. PHILLIPS [Champaign, Ill.]: Have you found any alpha hemolytic Streptococcus on your culture?

DR. SAURINO: Yes.

DR. PHILLIPS: Do you feel they are pathogenic?

DR. SAURINO: I honestly do not know. I found what I think are, first of all, pure and simple pneumococcus. How closely related the pneumococcus is to the Streptococcus is another problem. I have found alpha hemolytic cocci, gram-positive cocci, repeatedly. In the so-called clinically positive patient it has always been the beta hemolytic Streptococcus and the Pseudomonas. This has been so consistent that it worries me. This is not the way science works, but that is what we find.

DR. PHILLIPS: Isn't it true the alpha hemolytic Streptococcus is considered normal in the human pharynx?

DR. SAURINO: Yes, it is considered normal in humans. We have done solubility on those, bile solubility. They are true Streptococci, apparently bile soluble.

DR. RICHARD GILYARD [Waterbury, Conn.]: Dr. Teigland, in connection with the cultured group of horses, did you do blood counts?

DR. TEIGLAND: In this group there were blood counts on occasional horses. I do not have the data; it would be too confusing. In most of the cases there would be an increased white count in many of these, indicating probably a bacteremia. In some of these we also saw evidence of a viral entity because of high lymphocytes, and leukopenia. That is the only evidence I would have of viral infection. To isolate the virus gets into a big problem, and it is expensive.

We do have a lot of data we can correlate. There are blood counts on many of these horses. This year, in one of the horses, other than the group 1, the same stable had a horse this year that got a temperature of 105. I had an existing blood count on this horse where there were $16\frac{1}{2}$ Gm. of hemoglobin. In five days the

hemoglobin had dropped to 13 $\frac{1}{2}$. I do not remember exactly but the white count was higher than normal. It indicated bacterial infection.

DR. GILYARD: Was it consistent that with the high white count you had a lower hemoglobin in the cultured group?

DR. TEIGLAND: No.

DR. GILYARD: That is a rarity.

DR. TEIGLAND: I would not say "rarity."

DR. SAURINO: I certainly would not be surprised the causative agents—and I make that plural, specifically, because this is a complex entity. The white business of bronchitis or tracheitis is not due just to one or two bacterial organisms. I am sure viruses are implicated. I am sure there must be a dozen organisms implicated. I think it is the same problem in humans. What is the cause of a cold? Do you know? We must have thirty-eight different organisms listed, including viruses.

DR. TEIGLAND: I hope it is not felt that this is the answer to the cough on the race track. This is just an early approach. Maybe after a year or two we will know something, if enough people pursue this thing.

DR. SAURINO: The only thing we feel real pleased about is the easy method we can offer of taking a culture. This was not really too feasible in the past. This tube works, and works beautifully.

QUESTION: If I understand you right, you said the two organisms most frequently found were Streptococcus and Pseudomonas. Wouldn't it be advisable on each organism to run sensitivity?

DR. TEIGLAND: Separate?

QUESTION: Yes.

DR. SAURINO: I find if we run separate sensitivity plates on these organisms, this is not as reliable as making a collective plate. As a general rule, when you get a clear zone that hits the Pseudomonas, of course, the Streptococcus is hit. I feel that, as long as you can do this collectively, you can get the report back to the veterinarian the very next morning, which is an important item. When you separate them and run separate sensitivity discs, it gets confusing. You tend to lean toward antibiotics in operating in vitro, and the correlation is poor between that type of result and the in vivo result. I cannot help but feel it is the symbiotic type of thing, and the thing is to affect the whole kit and kaboodle.

DR. TEIGLAND: Our experience with stopping treatment too soon is probably not good. I believe you should follow treatment for at least six days, even though the symptoms subside. I feel

furadantin is not a good fever compound as used in the suspension, because I have had horses that have run a bit of fever while on furadantin. I am not too concerned with fever, unless it becomes dangerously high.

DR. ROSBOROUGH: We have used chloromycetin, even though it received unfavorable publicity. At the termination of six or seven days, b.i.d. as they recommended, blood counts were essentially within normal limits in the horses of this trainer I mentioned. He is very hypersensitive and a little bit critical of your activities, and he reported nothing. So, these horses were apparently all right at the termination of this. We are not particularly afraid of continuing with these antibiotics.

I think you will be disappointed if you try this and do not continue the treatment for what is, in your judgment, a rather long time, let us say, longer than you may be used to using antibiotics. We find if we stop, as he did with the furadantin after three days, there were exacerbations in the whole group.

DR. J. E. BURCH [Miami Shores, Fla.]: What dose?

DR. ROSBOROUGH: I Gm. b.i.d.

STANDARD-BRED LAMENESS

JAMES T. O'CONNOR, V.M.D.

Mr. Chairman and Gentlemen: From about 1950 to the present day the standard-bred, as a breed, has made terrific strides.

As with all racing breeds, lameness in itself is a major problem. It is too bad, in a meeting like this, that I have to stay on the standard-bred, because the standard-bred itself, as concerns lameness, is the average or the mean, shall we say, group. Putting thoroughbred, standard-bred and quarter-horse in their three places, the standard-bred having the forelegs involved, gives us a good average.

So, although I am going to speak on standard-bred, if we should say that something would go for the thoroughbred or other types, it is because they cannot be separated that closely.

Any condition of lameness, being a symptom as it is, must have a cause. Every man has his own ideas of these causes. I have listed my causes as these, and they may be mixed around to suit the standard-bred man. I have listed them in the order that I put them: No. 1 is fatigue, No. 2 is breeding, inherent with nutritional shortcomings. Then No. 3 is conformation. Then 4 and 5, accidental, occupational, you might say and, lastly; systemic reasons.

The diagnosis of lameness is actually the problem. The treatment of lameness will vary with the practitioner, each man having his pet means. Therefore, we should minimize in the standard-bred the error of diagnosis by using all of your known standard diagnostic aids, procedures, whatever you wish to call them, such as your hoof tester, hammer, wedge, anesthetics, radiographs and, lastly, your laboratory aids. With variables such as we have in the standard-bred, we must stay with procedure.

If this procedure is repeated often enough, we make the task easier, and we make it more accurate. We should never forget that last, as far as the means of diagnosis, we should not overlook our own natural senses, such as feeling, sight and sound. Sound is important in the standard-bred because, on a hard track, you can tell whether the diagonal feet are touching the ground at the same time. As to your observation as concerns this animal, what about his side of it? He should be given a fair chance to show his lameness. By that I mean outside the stall, and not taking the groom's word for it.

We have basic rules of procedure in saying that to view a fore-legged lameness, we should have him approach us as well as passing us sideways, and to view a hindleg lameness, we should have him leaving us as well as passing us. You should disregard the

nodding of the head of a standard-bred in diagnosing lameness because, if you try to diagnose lameness in a standard-bred by the nod of the head, as to whether it is a front or hindleg lameness, you will certainly get mixed up. Here you should watch the body of the animal.

Remember, a horse will always bear his body weight on the sound member. Pacers sometimes could fool you there. Another thing to remember is that he may be lame in one or all four members. So, you must be careful in diagnosing mixed lamenesses. You should eliminate one at a time.

[Slide] The first statement I made was that fatigue is one of our important factors here. With the standard-bred, we can help a lot of these things because of the condition of our track. We have hard tracks and soft tracks, and we even see bucked shins believe it or not, in our country in horses that are jogged with high-wheel carts and deep sand, especially where we are afraid of frost.

To try to keep the standard-bred away from the thoroughbred, as I said before, because of the speed which our standard-bred is assuming today, the animal's conformation is changing also. It is not the same animal we had years ago, when we had an animal that raced three out of five heats, say, or two out of three. Now they are down to dashes. On some of the tracks, where they can get starts and the track is not too overcrowded, these animals race twice a week.

We have done one thing with dashes, in this respect, from the standpoint of lameness. We have not only increased the speed of the animal but we have also cut down his conditioning.

[Slide] In the foreleg of the standard-bred, you see the side view from, say, the lower cannon down. The thing I want to bring out in this picture is notice where the suspensory ligament ends up, its terminatin. It is actually with the long extensor. So, what is it, a flexor or extensor, if you can go by the termination of it? That is important, from the standpoint of the standard-bred. We have so much trouble with raising and lowering heels. The idea is whether you raise or lower the heels, for different conditions and treatment. Below here you see the annular structure and the supporting structure. You see the old bugaboo, the distal end of that splint, which is always snapping off.

[Slide] Let us take a quick look at the inside of some of these feet. The only thing I want to bring out, as far as the standard-bred goes, notice the parallel position of the front of the foot with the coffin bone, the os pedis. They run hand in hand, like the tracks of a railroad. You also see the plantar cushion and other structures there.

[Slide] In our standard-bred, where we have a lot of pounding, we have the side bone condition that is annoying. But why I have the slide here is from the standpoint of raising and lowering the heels to keep them sound, and the reasons for it

This happens to be a boiled out ossified coffin bone. You can just visualize the encasement of those side bones. They have ossified. Of course, the standard-bred takes a little more pounding than the thoroughbred because of the track conditions, and because of the conformation, and the grain of their hoof, you might say.

[Slide] Here we are getting into our reasons for raising and lowering. In the first picture we have what we call a short heel and long toe, whereas in this one we raised the heel and lowered the toe. See what it has done to our structures up here. We have raised this heel, and see what we have done to the suspensory. We have thrown it under tension, showing, again, that by raising the heel and lowering the toe, we are stretching the extensor structures where they terminate.

Notice in the one away from me that, with the low heel, we have tensed the flexor structures. These are natural drawings, incidentally, done by a good friend of mine, from a live horse. You notice the tendon there. Looking at the two pictures, with the raising and lowering, you see what we have done to the angle of the fetlock. We put a strain on it, in this high heel, and we have made it straighter on the forward leg.

Before we leave this slide, notice the side bones showing through there. That is one reason you never raise the heel for side bone trouble. When you raise the heel for side bone trouble, you stress the whole thing, and the animal is coming down into a closed, walled off vice. The heels cannot expand in this condition, and he is lame, and he is no good for anyone.

[Slide] When the frog itself receives pressure, in a standard-bred or any horse for that matter, we also get a slight strain on the suspensory ligaments, because we are slightly raising that heel. It does not show on the flat but, when an animal is under flight and coming down, you see what we have done is we have shoved out our lateral cartilages. That is the reason we will not dare put heel pressure on any standard-bred on a hard track,

[Slide] Looking at this near front leg, we have raised the inside quarter, and we have lowered the outside heel. In the standard-bred, because of the conformation, where one might hit its knee and yet he would not have knee trouble but because of his conformation and other reasons for lameness, he assumes an inward and outward arch of the feet. So many times an animal will stand with his toes outward. The blacksmith will take the outside heel down to make him swing just a little wide. There is an old say-

ing that a miss is as good as a mile, when it comes to hitting one leg against another. As long as you can miss it, you consider yourself lucky.

Here, again, we have strained the outside branch of the suspensory. From a diagnostic standpoint, as to the explanation of the wedge, which is a subject in itself, that we do not have time to take up here, I will say one thing, and it will be important for you standard-bred men in trying to determine foot lameness in this respect. You say, "What is that doing to the horse's foot?" It is compressing the outside—that would be the inside because this happens to be the near leg—and stretching the other. So that eliminates immediately a bruise from a tear or from a ligamentous stretch, sprain, whatever you choose to call it.

[Slide] In the standard-bred business, as veterinarians, you are confronted with these flight problems, where one foot hits the other, and cannot get one out of the way, and all that sort of thing. That red line coming down the center is nothing but the center of gravity.

[Slide] On the low heel, which you catch in the front foot, when a standard-bred is going forward whether he trots or paces it makes no difference, it takes more inertia for him to break over a low heel with a long toe. Naturally he snaps as high and, in snapping, he takes a high flight and he slopes out behind.

[Slide] In this hind one, with the real high heel, the 65, it takes no inertia. He has practically broken off, you might say, so it does not take too much trouble to get over. When he gets over, he raises high and drops. In a horse, a pacer or trotter, the idea is to get the front foot out of the way and to delay the back one.

A fellow gave me the devil the other day because I told him he had to slow the horse up. He said, "Hell, I have been working all summer to speed this thing up and now you tell me to slow him up." That is the idea of the thing. [Laughter]

[Slide] This is a dorsal view, just a general look at the horse's leg. You have the three main diagnostic nerve roots, your median, ulnar and cutaneous branch of the mucocutaneous. The red is the ulnar.

[Slide] That is the volar view. This is the right foreleg. By knowing all these tracts, we can, with very simple blocking—it is not too simple, but we can get an idea of where our three trunks are that are giving us some trouble, if we want to pin down a real lameness.

[Slide] The blue here represents the area covered by the mucocutaneous.

[Slide] That is the outside lateral of the ulnar block. The ulnar block goes in up here between these two, the lateralis and

the flexor, covers this complete area here. So, if you were going to fire a knee on the standard-bred and wanted to do a quick job and get out, you would do one block which would throw this out, and put another shot on the inside and go right to work in a few minutes. It saves a lot of time and saves a lot of filing afterwards, from a lot of novocaine, and things like that.

[Slide] In the standard-bred, we have this condition, the so-called dishing of the foot due to improper care, such as low grade laminitis and different things, where the os pedis tips down slightly enough to give a sting around the white line. When you see a foot like this you have to be very cautious, as you may have a band contraction.

Today, in the standard-bred business, we do not have the caretakers we used to have. They do not know what castile soap is, some of them. The blacksmith takes the periople right off and exposes the thing to dryness. He puts on a lot of old grease. We are getting contractions by the minute, making things worse.

[Slide] This shows the same foot, only it shows the extent of coronary contraction. That hurts an animal, especially when pounding a hard track. That is neglect. To correct that immediately, you would have to go right to swabs. If you are going to use swabs, the best thing to use is 20-Mule Team borax, because you have a solvent effect. Do not leave the swab on all night. In the evening, when you take the swab off, you can put some lanolin on to hold what moisture you put in the foot. The next morning, when you put the swab back on, it will take a certain amount of borax to let the moisture back into the foot.

[Slide] This is the worst trouble in our young. This happens to be a contracted heel in our standard-bred. It is very common. The Chadwick spring that you see in that foot is not recommended by me nowadays, unless you have a top quality caretaker. I would put one of these on the front foot of a pacer, but I would not on a trotter. The reason is, at the apex of your spring, where leather is over this, they will wear through. Unless a man is watching them every day, they will wear through, on the modern tracks. We have one track, with which I am very familiar that for surface uses stone dust, very fine stone dust. I believe the blacksmiths supply it for them, because they will use a set of shoes a week. That is just jarring. [Laughter]

When this breaks through and the horse is sliding into his last filght, this thing comes through. To get one of the things out of there, you have to use a good anesthetic, block the section. In doing it, you tear the whole plantar structure up behind the buttress, even damage the cartilage on the corresponding side.

[Slide] That shows a little better whether you should spring this or not. A normal foot will have a straight bar. When you see a bar that is curved, you know whether it is contracted or not.

[Slide] The unilateral contractions which we get in our standard-bred present one problem, and that is proper correction. We get a lot of this type. This causes very bad lameness. This thing keeps curving in and the bulb keeps coming out. The top thing is just a plaster of paris. The secret of doing it is this; have no bearing at all on the full side. You do not want any more expansion there. Put your bearing here. Do not have any pressure. Use the bar shoe and taper down. We call that beveling out. When this foot starts to come under the pressure of the drive, it can only go in one direction. With moisture and exercise, that is very easy to correct.

[Slide] The point of this is, when you have a condition of unilateral contraction, be sure you can drop a plumb line from the bottom of the heel to the shoe, so you can touch it. If you do not do this, your force coming up will not give you the full expansion.

[Slide] Do not let any of the men put heel nails in the contracted side, because it defeats your purpose.

[Slide] This poor animal got sick eating Kentucky blue grass. [Laughter] We have a problem in hindleg lameness, so-called trochanteric bursitis. The old method of treating this is to inject the trochanter, take Lugol's and put it in spots all around.

[Slide] You men that are in this harness business, with modern treatment and all, such as steroid type treatment, many times have to inject bicipital bursa. The bicipital bursa can be reached with a 20 gauge needle. If you point your hand on the crest of it, that is the highest point of the greater trochanter, where your thumb lies, you will find a ring that rolls, actually rolls and will stick out under your thumb. That is where your trochanter is. You must remember to inject that. You should have a man on the opposite side. Have him put his hand on the trotter or pacer, whatever it is, and just gently push him to you. That tenses the ligament of that gluteal section, and actually sticks that out to you, so you can draw oil from it, when they are distended.

[Slide] In the standard-bred, or any horse, behind the greater trochanter, there is a small muscle bursa. It is wise to inject at that point, just underneath.

[Slide] This is something you had better be careful about. I had one at Foxborough last summer that was diagnosed as stifle lameness. This is a rupture of the anterior tibialis. You will always get the hamstring flopping. You can pick it up, and it will wiggle like a snake. That is your diagnosis. That animal is out of racing for a year, anyway, under proper treatment.

[Slide] When you have to inject the bicipital bursa, the easiest way to do is to draw the leg forward and go in head-on with

a 2-inch, 20-gauge needle. Go through the tendon. You think you are going to break the needle in half. You can use cortisone or whatever you want to put in there. It saves a lot of injecting all around and getting nowhere.

[Slide] You trotting men and pacing men have the problem of trailers on hindlegs. They are always arguing where to put the trailer. The only reason you put a trailer on an animal is that he is probably standing cow-hocked or dimple-toed behind. Usually they stand slightly toed-in behind. So when they come back down on the ground, the next break will come over, and they will hit the opposite foot on the pacer. The thing to do is to be careful that you do not make a radical change. If you have a horse going 2:05 and you say, as I did last summer, "I will fix that and have him going 2:03."

When I finished up, he was lucky to get out of the barn because I took off too much. It took me the rest of the summer to correct what I did, because I said, "I got it made. We have a two-minute horse." Thanks.

DR. J. D. CHASSELS [Brampton, Ont., Can.]: How would you trim a toeing out behind?

DR. O'CONNOR: Toeing out beh'nd, I would take her outside down. You see, when she toes out behind, she will break over on the inside. By her breaking over on the inside, she will wear the inside down, making the outside longer. So that the lower the inside gets and the higher the outside gets, you accentuate. So, by dropping the other way, you bring it out.

LABORATORY TESTS FOR THE EQUINE PRACTITIONER AND THEIR INTERPRETATION

DAVID CRISMAN, D.V.M.

In the diagnosis and treatment of the Thoroughbred and Standardbred horse, the equine practitioner frequently finds it helpful and in many instances necessary to submit specimens to the Clinical Laboratory for examination.

These specimens are usually blood, urine, feces, and other materials for serological and bacteriological examination, which include swabs, discharges, skin scrapings, agar slant cultures, and blood cultures. In some instances post mortem specimens may be submitted for microbiological, chemical examination, or toxicological examination.

Generally speaking, the laboratory results fall into two classifications: (1) "significant" which means that they are not comparable with those values which have been established as a normal range, or (2) "not significant" which implies that they exhibit no significant deviation from these same normal ranges.

In regard to the Thoroughbred and Standardbred horse the term "normal range" is probably an unfortunate term. "Normal range" values as given for the horse are usually so wide as to be meaningless from a diagnostic standpoint. For the race horse and particularly the "horse in training" more exacting values must be established. These values might more properly be termed "desirable or optimum ranges."

The meaning of the word "health" is one of degree and comparison where the race horse is concerned and does not mean simply "free from disease." The equine practitioner is frequently asked to improve or restore the potential racing form of a horse which is apparently healthy, in the accepted sense of the word, and laboratory tests may in these cases be of aid in obtaining this maximum potential performance.

These optimum values are determined not only from the literature but also from personal experience. In some instances, the laboratory must establish its own values, since methods of analysis vary and may give somewhat different numerical results. For example: The serum protein fractions may vary depending upon the laboratory method used.

Laboratory results may be of little value and possibly misleading if the specimen is not properly collected or is altered in transit to the laboratory. When mailed they should be sent first class and

marked special delivery or special handling, if possible. The specimens should first be chilled and then mailed at such a time as to assure the shortest time in transit possible.

In collecting the specimen some thought should be given as to what constitutes a representative specimen. Samples of blood from the same horse will vary considerably depending upon the time of sampling. For example: Do not take the blood specimen immediately after a work or race and also not immediately following a feeding. It is best in blood analysis to take the specimen at some regular time while the horse is at rest and relaxed. If the horse is excited and considerable difficulty is encountered in the taking of the sample, the hemoglobin and red cell count may show a hemo concentration of purely a physiological nature.

With the exception of the mare, the collection of a urine specimen by means of the catheter is impractical and such samples are usually collected from natural voiding. Many samples are collected following the cooling-out after racing or a work. Care should be observed in taking a urine specimen to prevent gross contamination.

Since the composition of blood, for example, may vary considerably with age or in the case of a mare whether barren or in foal, it is important to state the age, sex (whether barren or in foal) and the clinical history is also important in evaluating the laboratory results.

It is our purpose to briefly discuss some routine laboratory tests which are helpful in Equine Practice.

BLOOD SPECIMENS

The composition of the blood probably reflects the general well-being of the horse better than any other specimen. Routinely we make the following analysis on the blood serum: total calcium, ionized calcium, inorganic phosphorus, and serum proteins.

Calcium: The total calcium is essentially the same for all ages and sexes.

The ionized calcium or diffusible calcium is also important because it is the physiologically active portion of the serum protein. The ionized calcium is essentially the same for all ages and sexes, except that it is higher in the very young and it may be lower in mares in foal.

Inorganic Phosphorus: Phosphorus is involved in various phases of organic metabolism and is intimately related to calcium in many respects. The inorganic phosphorus content of the blood serum varies with age, decreasing as the horse grows older. Mares in foal may have a slightly lower inorganic phosphorus content.

Maintenance of the serum calcium and inorganic phosphorus concentration within a narrow range is of importance; the calcium

particularly has a profound influence on certain fundamental processes affecting cell function (e. g., membrane permeability, neuromuscular excitability).

The calcium content of the blood serum is effected by many factors such as parathyroid hormone, Vitamin D, plasma proteins, plasma phosphate, acid-base equilibrum and type of feed.

While recognizing the complexity of the calcium and phosphorus relationship, we believe that proper calcium and phosphorus values are best maintained by adequate calcium and phosphorus in the feeding program. Under the stress of training and racing blood calcium may be deficient and supplementary calcium added to the feed may correct this condition.

Low inorganic phosphorus values occur less frequently and again may be corrected by addition of phosphorus in the form of phosphate salts or bran.

When the calcium and phosphorus are not in proper proportion, usually because the inorganic phosphorus is excessive, the condition can often be corrected by the increased ingestion of calcium.

Serum Proteins: The total serum proteins are essentially the same for all ages and sex (one to five years), except that it is usually higher in the mare in foal because of the increased globulin and is lower in weanlings because of the lower globulin content.

The total serum proteins are about 6.1 to 7.0 grams per 100 ml. The serum proteins are a very complex mixture which includes not only simple proteins but also glycoproteins and lipoproteins.

Up until a very short time ago, we have restricted our breakdown of the serum proteins to the determination of the albumin and globulin contents. The clinical method commonly used for such a separation is the "salting out" procedure where the globulin is removed by treatment with a sodium sulphate solution. It is recognized that the albumin values obtained by this method are too high. However it does serve a useful purpose in determining the relative albumin-globulin ratio.

More recently by means of the paper electrophoresis technique it is possible to routinely make a more complete quantitative separation of the globulin fractions. At the present time, we are studying this technique to establish normal patterns for the horse and expect to be able to more effectively interpret the abnormal patterns. The principal fractions of the globulin are the alpha, beta, and gamma portions with some subdivisions. In plasma we would also find fibrinogen.

In the horse increase in serum proteins is almost always related to increased globulin, usually of the gamma fraction and is indicative of some antigenic stimulation such as infection. A state

of toxicity may also result in such a rise. Increase in albumin is not common but may occur in dehydration. Decrease in albumin may be the result of inability to synthesize albumin in the liver, malnutrition, loss in the urine through kidney dysfunction or edema. In the pregnant mare the albumin is lower and the globulin fraction is higher. Very young weanlings are low in globulin.

Great variations in the serum protein content are seen in the Thoroughbred which are difficult to explain since they are frequently not accompanied by any clinical symptoms or substantiated by other clinical tests. Our experience shows an apparent increase in the instance of low serum proteins which is difficult to account for except on the grounds of poor nutrition. Here again, unless other clinical tests clearly indicate some definite pathology or dysfunction, assurance of adequate proteins in the feed is essential.

Nonprotein Nitrogen: Alterations in the total nonprotein nitrogen content of the blood depends upon variations in the concentrations of its constituent elements such as urea, uric acid, creatinine, amino acid nitrogen, ammonia, and residual nitrogen. From the clinical laboratory standpoint urea and nonprotein are the most important and excessive amounts of either generally indicate renal function impairment.

Cholesterol: Increased cholesterol is observed in kidney dysfunction, bile duct obstruction, and *hypothyroidism*. Decreased cholesterol may be the result of anemia, hepatic disease, infection, and *hyperthyroidism*.

Protein-bound Iodine: Since protein-bound iodine (PBI) in the blood plasma probably represents circulating thyroid hormone, determination of this factor is one of the most direct approaches to the evaluation of the state of thyroid function and furnishes more reliable information than does the basal metabolic rate or the blood cholesterol level.

One suggested use of this test in the race horse was the possible determination of the racing potential of a horse at an early age. We had considered the possibility of predicting the future potential racing ability of yearlings by the use of protein-bound iodine determinations. The thought being that the protein-bound iodine does not change with the age and that there might be established an "ideal" protein-bound iodine value for most efficient racing.

It would be interesting, for example, to determine the protein-bound iodine values for horses of proven racing form and to run protein-bound iodine values on a number of yearlings and see if there is any correlation in the values and their racing ability, since the protein-bound iodine value is proportional to the basal metabolic rate.

Sodium and Potassium: Sodium and potassium are concerned with (1) the maintenance of normal water balance and distribution, (2) the maintenance of normal osmotic equilibrium, (3) the maintenance of normal acid-base equilibrium, and (4) the maintenance of normal neuromuscular irritability. One of the actions of the adrenal cortex hormones is upon electrolytes and water. For example: A decrease of such hormones will cause a decrease of sodium in the plasma with an increase of potassium. On the other hand, an increase of such hormones will cause an increase in plasma sodium and a decrease of the potassium. The use of the flamephotometer makes it possible to determine the sodium and potassium content of the blood serum and other body fluids on a practical basis. We hope to make greater use of this instrument in routine analysis as an aid in detecting abnormal and correctable metabolic processes.

Magnesium: The metabolism of magnesium is associated with that of calcium and phosphorus and, in our experience, the serum of the horse has not shown any significant deviation from the normal.

Cellular Hematology, which includes determination of the hemoglobin, erythrocyte count, leucocyte count, erythrocyte volume, and differential count is probably the best known and most commonly used of the laboratory tests for blood samples.

Hemoglobin: The hemoglobin content of the race horse is somewhat higher than that of other animals. It is essentially the same for all ages and sexes. In the case of weanlings it is definitely lower.

Erythrocytes: The erythrocyte count is essentially the same for all ages and sexes, except for weanlings in which case the erythrocyte count is slightly higher.

Leucocytes: The leucocyte count shows an apparently wide normal range. It is essentially the same for stallions, geldings, and barren mares. It is slightly higher in the case of mares in foal, and definitely higher in weanlings.

Erythrocyte Volume: The erythrocyte volume is essentially the same for all ages and sexes, with the exception of weanlings. In the case of weanlings it is somewhat lower.

Anemia: The maintenance of an optimum hemoglobin and erythrocyte count and volume is not always easy in the race horse in training. In many cases the erythrocyte count may be satisfactory but the hemoglobin and erythrocyte volume will be low. The erythrocytes carry a reduced quantity of hemoglobin and they are smaller than normal. This condition is associated with so-called "iron-deficiency" and we think is helped by the administration of hemogenic compounds. This condition is also seen in chronic blood loss due to intestinal parasites.

Hemolytic anemia may also be caused by destruction of erythrocytes due to bacterial infections such as streptococcus, virus infections such as infectious equine anemia, protozoan infections, and chemical poisons such as over-dosage with phenothiazine. In these cases there is a reduction in the values of the hemoglobin and also the erythrocyte count and volume.

Hemoconcentration: An increase in the hemoglobin and erythrocyte count and volume beyond the normal range is frequently seen in horses. This is sometimes the result of the excitement and stress accompanying the taking of the blood sample. It is present in an exaggerated form in the terminal stage of a fatal disease or toxicity. It also can be the result of severe diarrhea or reduced fluid intake.

Leucocyte Count: The leucocyte count of the race horse may run as high as 11,000 per cu. mm. and may still be considered normal. In weanlings the normal range will run as high as 14,000. We believe that counts in excess of these limits indicate some degree of infection particularly if the erythrocytes are also altered.

Differential Count: An increase in the neutrophile count usually indicates some bacterial infection. The lymphocytes are frequently as numerous as the neutrophiles in apparently normal individuals. However a definite increase in lymphocytes is usually associated with a virus infection, toxic condition, or a mixed infection such as sinusitis or respiratory infection.

An increase in the eosinophiles is believed to indicate some allergic condition or internal parasites. The allergic condition may manifest itself as a chronic skin condition or gastro-intestinal disturbance.

Serological Tests: Some of the common serological tests used in race horses are the agglutination test for *Salmonella abortivaequina* infection in mares. The agglutination, complement-fixation, or agglutination-lysis tests for leptospirosis as well as other less common bacterial infections.

Unfortunately, there is no acceptable or practical laboratory test for the virus of infectious equine anemia; however, the hemo-agglutination test using the red cells of the chicken has been suggested by some authorities as being of some use as a non-specific test for virus infections. If specific viruses are available hemo-agglutination-inhibition tests are useful.

Pregnancy Test: For the past twenty years we have performed the pregnancy test on mares, using the immature rat and following the procedure as outlined by Hart and Cole. The pregnancy test on the immature female rat, using the blood serum from the mare, is accurate between the 45th and 140th day of pregnancy. Before or after this period it is possible to get a "false negative."

The lower limit of 45 days is rather critical, since we have had a negative at 41 days and a positive at 49 days from the same mare. The ideal blood specimen should be taken between the 60th and 90th day. The upper limit is not so critical, since we have had good positive reactions at the 200th day of pregnancy.

Our results with this test have been satisfactory. "False positives" are in some cases due to the inadvertant administration of sex hormones prior to sampling; in other instances they may be the result of undetected early abortions. We have no evidence to support the view that cystic ovaries will give a "false positive."

After the 140th day, the chemical Cuboni test has been used on the urine but our results with this test have been unsatisfactory and it has been used to a very limited extent.

FECAL SPECIMENS

In addition to the routine examination for parasitic ova, a bacteriological examination may be of value where scouring is the principal clinical symptom or the feces is of an unusual color, odor, or consistency.

The occurrence of diarrhea in the race horse is not uncommon and might be classified as follows:

- (1) Acute or chronic types which are apparently the result of nervous stimulation.
- (2) Subacute to chronic following the use of antibiotics, which have depleted the normal flora of the intestinal tract and frequently resulting in abnormal numbers of Clostridium or fungi. This type will usually respond when the normal flora is restored. As an aid in restoring the normal flora, we have administered viable coliform organisms in enteric capsules which are given per os. This treatment will in some cases clear up chronic skin conditions which are allergic in nature.
- (3) Chronic cases which are the result of irreparable damage to the mucosa of the intestinal tract. These cases, in general, do not respond to any treatment.
- (4) Acute cases due to the ingestion of spoiled or improper feed.
- (5) Intestinal infections which are caused by such organisms as *Salmonella*, *Shigella*, *Proteus*, and occasionally *Beta hemolytic Streptococcus*.

URINE SPECIMENS

The physical appearance and consistency of the race horse urine, particularly of the horse in training, is rather characteristic. It is a heavy viscous solution usually of an amber color.

If the specimen of urine is taken after racing or a "work" it will have an acid reaction with a pH between 6 and 7. The volume voided is usually not more than two potters and generally less. Following exercise the test for albumin will often show a plus one or plus two reaction.

The pathologists tell us that the incidence of pathological involvement of the kidney is rather rare.

Because of the physiological function of the urinary tract of the race horse, we believe that there is frequently a local irritation of the urinary bladder. This is indicated by a high alkalinity (7.5 to 8.2 pH) and the presence of excessive quantities of calcium carbonate and phosphate salts in the urine.

A bacteriological examination of these alkaline specimens usually indicates the presence of large number of gram positive hemolytic micrococci of the viridans type. There is some indication that the alteration of the high alkalinity by the administration of acid salts and treatment with some appropriate antibiotic if the organisms are present is beneficial.

In addition to the micrococci there may be present *Staphylococcus*, *Streptococcus*, *Coliform*, and *Proteus*.

In urine with an acid reaction we usually see less bacteria but occasionally find yeast cells which are very resistant to treatment but which are of doubtful significance.

BACTERIOLOGICAL CULTURES

In addition to fecal and urine specimens there are a number of specific culture specimens pertaining to the race horse.

Culture specimens are usually submitted to the laboratory as swabs, agar slants, or tissue material.

Cervical Cultures: Cervical specimens are taken with either swabs or an inoculating culture loop which is used to inoculate an agar slant of some enriched medium such as brain heart or liver infusion.

Care should be taken in collecting the sample to prevent contamination by the use of speculum and careful technique.

In addition to hemolytic *Streptococcus*, *Salmonella abortivaequina*, *Shigella*, and *Klebsiella*, which are considered pathogenic and involved in breeding troubles, we find other so-called "normal flora" and contaminants. These latter consist of Anthracoids (gram positive aerobic sporulating rods), *Coliform*, *Proteus*, *Paracolon*, *Staphylococcus*, both non-hemolytic and hemolytic, *Pseudomonas*, and frequently a chromogenic (brownish-yellow), hemolytic, slender, gram positive rod resembling a *Lactobacillus* (Doederlein).

The presence of *Pseudomonas aeruginosa*, hemolytic *Staphylococcus*, and *Proteus* are certainly undesirable and, in our opinion, should be cleaned up before breeding.

We believe that the laboratory culture is an aid in making the clinical examination and judgment should be used in evaluating the report. For example: If the clinical appearance is unsatisfactory but report is negative, a check specimen is indicated.

Nasal Cultures: Swabs or culture slants are frequently submitted from the race horse suffering from coughs and rhinitis, with or without pulmonary involvement. The organisms which occur most frequently are large sporulating gram positive rods, gram negative rods of the *Escherichia-Aerobacter* group, *Staphylococcus aureus* and *albus*, *Pseudomonas aeruginosa*, hemolytic and non-hemolytic *Streptococcus*, *Diphtheroids*, *Proteus*, and a yellow pigmented, non-hemolytic, gram negative rod identified as a *Flavobacterium*.

Sensitivity tests can be run on isolated organisms and are an aid in treatment.

Blood Cultures: In the detection of generalized infections or bacteremia, blood may be drawn directly from the jugular vein into a bottle or flask of prepared liquid medium for culturing in the laboratory. Care should be taken in preparing the site of the needle in order to prevent contamination of the specimen.

For the detection of pathogenic bacteria in the blood stream, the specimen should be taken while the patient has an elevated temperature.

Skin Scrapings: "Skin scrapings" may be submitted to the laboratory for the diagnosis of pathogenic fungi, which are usually *Microsporum* or *Trichophyton*. These should include material and hair from the periphery of the lesion and deep scrapings should be made rather than superficial.

SEmen Specimens

Semen specimens may be submitted to the laboratory for counts, motility, and morphology of the spermatozoa.

Bacterial cultures are also frequently made. The presence of *Pseudomonas aeruginosa* is considered significant in regard to breeding efficiency.

It should be understood that there are many more laboratory tests which might be useful to the equine practitioner; however, the tests discussed are those which, we believe, are of special and practical value.

NORMAL VALUES FOR THE THOROUGHBRED RACE HORSE

TOTAL CALCIUM

For all ages 12.5 to 13.5 mgs. per 100 ml.

IONIZED CALCIUM

| | | |
|---------------|--------|----------------------|
| Very young | 6.6 to | 6.8 mgs. per 100 ml. |
| Other ages | 6.1 to | 6.6 mgs. per 100 ml. |
| Mares in foal | 5.7 to | 6.1 mgs. per 100 ml. |

SERUM PROTEIN

| | | |
|--------------------------|--------|---|
| For all ages over 1 year | 6.1 to | 7.0% (Albumin 3.2 to 3.8% Globulin 2.3 to 3.0%) |
| Mares in foal | 6.7 to | 7.2% (Low Albumin-High Globulin) |
| Weanlings | 5.0 to | 5.5% (Low Globulin) |

INORGANIC PHOSPHORUS

| | | |
|---------------------------|--------|----------------------|
| Age: 3 months to 6 months | 6.6 | mgs. per 100 ml. |
| 6 months to 1 year | 5.8 | mgs. per 100 ml. |
| 1 year to 1½ years | 5.2 | mgs. per 100 ml. |
| 2 years | 4.3 | mgs. per 100 ml. |
| 3 years | 3.8 to | 4.3 mgs. per 100 ml. |
| 4 years | 3.4 to | 3.8 mgs. per 100 ml. |
| 5 years and over | 3.2 to | 3.6 mgs. per 100 ml. |
| Mares in foal | 3.0 to | 3.6 mgs. per 100 ml. |

MAGNESIUM

2 to 4 mgs. per 100 ml.

NONPROTEIN NITROGEN

20 to 40 mgs. per 100 ml.

UREA NITROGEN

10 to 20 mgs. per 100 ml.

CHOLESTEROL

120 to 200 mgs. per 100 ml.

SODIUM

350 to 400 mgs. per 100 ml.

POTASSIUM

15 to 25 mgs. per 100 ml.

PROTEIN-BOUND IODINE

3 to 5 mgs. per 100 ml.

HEMOGLOBIN

13.5 to 15.5 gms. per 100 ml.

ERYTHROCYTES

8.5 to 11 million

(Average—9 million)

LEUCOCYTES

6 to 11 thousand

ERYTHROCYTE VOLUME

| | | | |
|------------|----|----|-----|
| Weanlings | 35 | to | 37% |
| Yearlings | 37 | to | 40% |
| Other ages | 40 | to | 45% |

DIFFERENTIAL COUNT

| | | | |
|-------------------------|----|----|-----|
| POLYMORPHONUCLEAR CELLS | 45 | to | 60% |
| LYMPHOCYTES | 35 | to | 55% |
| MONOCYTES | 1 | to | 2% |
| EOSINOPHILES | 1 | to | 3% |
| BASOPHILES | 0 | to | 1% |

ORTHOPEDIC SURGERY IN THE HORSE — A PANEL DISCUSSION

Moderator Charles Raker, D.V.M., D. D. Delahanty, D.V.M.,
Jacques Jenny, D.M.V., William O. Reed, D.V.M.,
J. D. Wheat, D.V.M.

MODERATOR RAKER:

This afternoon, I think what we will do is just proceed in the order listed on the program, and then at the conclusion we will open it for questions or discussion from the floor.

ASPECTS OF DIAGNOSIS AND X-RAY

D. D. DELAHANTY, D.V.M.

Mr. President, Dr. Raker and Colleagues: I have left the while field of judgment, of surgical know-how to my colleagues who are better equipped than I, but I would like to dwell on my particular part of the program, on x-ray itself, because we all recognize the fact that, without good diagnostic films, sometimes our judgment of surgery is wrong. So that to many of you this may be somewhat of a review. Excuse me, if it is. Perhaps I have a few points to offer to you, as far as x-ray problems are concerned.

I would like to divide our problems into two: those that we call inherent problems, and these I will list probably as motion, distortion, angulation, magnification, detail, and perhaps, not too narrow a field to consider a little bit, protection of ourselves.

Next, our problems in diagnosis such as, first of all and most important, normal radiographic anatomy. What is it? What are the normal, aberrant forms we do see? How do we recognize these? What leads have we got to better our knowledge? I hope some day somebody will write a book on what are normal and subnormal variations. Then secondary radiation; the control of artifacts on films, those things we put on through errors in judgment; adequate visualization of joints, which we are concerned with in this particular panel, particularly that joints are covered from all angles. Lastly, and very important, good reading, good eye accommodation. You cannot walk out of a snow bank and expect to see x-ray films. It takes time to get your eyes adjusted. If we can control these factors, or improve them, we will get good diagnostic films. Without

good diagnostic films, we have no value, as far as our surgical judgment is concerned.

I will go back and start with motion. This is the biggest factor we have in animal radiology, motion, how to control it. We all know what a poor film can do, as far as our vision is concerned. It can completely obscure things.

Our motion factor is not controlled enough today so that we can use unit techniques, such as planography, where we move the cassette and film and get plane of bone tissue out in clear detail. Here are three films to show you some of the problems in motion.

[Slide] This is just a third phalanx. You can see there is motion there, but the other factor which you will note later on is that of secondary radiation from the steel in the shoe. Notice the tip of the third phalanix is tipped, as Dr. O'Connor was talking about that drops in hot track laminitis. It is not detailed enough so we can be certain how much damage has been done.

[Slide] Here is a lateral film of the metatarsus, with a split. It looks like a big cavity. This is osteomyelitis. Notice the comparison of this to the next film.

[Slide] This shows you periostitis. The longer you look at these films, the more you can see. This is a factor of eye accommodation.

Most of us here play around with photography. We all realize that if we want to get film in fairly good detail, we have to take an exposure of at least a twenty-fifth of a second. Many of us require a fiftieth, and occasionally a hundredth of a second. That is done with a 5-pound camera. Let us take a 20-pound one-the x-ray head, and try to hold it still for one second. Gentlemen, it is physically impossible to do it. We can take a deep breath, steady ourselves, spread our legs apart, but there still is too much motion for fine detail. May I make a suggestion that we try to anchor this in some way to the ground. A single stick coming down from the head, with a suction cup sticking into the sod will often give you that added support, so that you can take exposures as long as a second and minimize the motion factor. It is there; it exists.

Another thing is that buzzers and timers all make noise, and some of the horses, when they hear them, think they are back in the races again. I can whistle "Yankee Doodle" about all the way through, without taking a breath. It is a distraction mechanism. You can whistle, you can clap or do anything you want. One of these things before the timer goes off will eliminate the noise factor. Another suggestion is the use of

electronic timers. They are costly but do minimize the noise factor.

Along with motion from noise is motion from the nice, bright chrome plated x-ray cone. You move it just a little and the light flashes, and we are off again! In every film there is a certain degree of distortion. It is present in all of them. It must be controlled.

[Slide] This is rather dark. Notice that we have the weight of the navicular bone sticking closer to me, where we use distortion to bring up the corners of the navicular bone. This process can be carried to quite a degree. The longer the cone that we use, the better the target, the easier it is to line up the part of interest.

Magnification is a factor that is always present. If we must minimize, that is possible by putting the part of interest closest to the film. Rarely will we reserve the procedure to completely obliterate overlying bone detail. There we use a very close film, focal spot distance completely below it, out of the way. This is occasionally done around the head and neck but very rarely done around the extremity.

We all cry for more detail. The more we can see,, the happier we are. We recognize the fact that a small lesion, as big as a pine-head, can be the difference between a successful or unsuccessful race horse. That detail must at all times be visible to us.

Most of us do have x-ray units. Perhaps those of us who do not, in purchasing new ones, should check into the focal spot. Do not be worried about the focal spot units. If you do not run the machine under constant radiation, you will have no problem with heat dissipation. Most of us take a few minutes between, and heat dissipation will be adequate, under those circumstances.

There are many things that will complicate detail. Heavy metals of all sorts; lead, mercury, lead, mercury acetates, zinc sulfate, iodine in many forms, white lotion, antiphlogistine, kaolin, plain kaolin, all prevent you from getting good detail. Clean up the part. I have sometimes flatly refused to take films, saying, "Go home and clean the leg, and then we will take the films." They do not like it the first time but never repeat it a second time.

We use extremely fast screens sometimes, to cut down on the motion factor. You have to remember that the faster the screen, the poorer the screen detail.

[Slide] This is a lateral of a nice comminuted fracture. It is almost too good to be true, but we did block out the leg before we took the x-ray.

Besides the animal, we have cassette motion. I think, if I recall correctly, Mr. Gray, the x-ray technician at Colorado, developed what he called a banjo, a long handle with a clamp on the end, and a broomstick on the bottom. This banjo allowed the holder to get away from the film, let the man get safely away from the horse, and have the cassette steady.

There is another way to control motion, keep the cassette steady. Sometimes hands are not too adequate for this.

I strongly recommend if you are allowing lay people to hold the cassette, you should give them a pair of lead gloves. I think you might be legally liable for burns.

We all have our preference on films. I use Kodak, what they call royal blue film now, cutting our exposure time by 20 per cent. It is certainly valuable to help control motion. Sometimes you can even get up to 50 per cent of exposure time.

Also worried about motion on the animal. Sooner or later we have to read this film. If I can now contradict all I said before about time, motion and so forth, I prefer a film that is overexposed to one that is underexposed. If you are going to err in exposure, err on the overexposure side. By increased illumination you can gain the detail that is apparently lost on the first inspection.

Most of us are in a great hurry. We spend fifteen minutes to get the film but are just a little bit too selfish to spend two extra minutes in developing. Most of us develop three minutes at 68° , unless we are down South and we have to use high temperature, tropical type developers. If you will take the extra two minutes available in the developing, you will bring up maximum detail and scotch off 10 to 20 per cent of the exposure.

Again, we are saving time at the machine end, the x-ray end of the exposure. Use the five-minute developer, use maximum developer, and you will get the same degree of film and, believe it or not, you will be pleasantly surprised about the quality. I have even gone seven or eight minutes, occasionally, in an animal that moved halfway or three-quarters of the way through the exposure, and I have been able to salvage useful film, without the necessity of repeating the exposure.

We have mentioned controls as far as secondary radiation. Again I must stress cones. They are our best help. The long, narrow cone protects you from secondary radiation. It protects your diagnostic ability, too, because you will be able to center on the part. Distortion becomes less of a factor. It does guarantee better detail, through lack of secondary radiation.

One useful piece of equipment that I like, and I do not use

it very often and sometimes I question, if I were outside the halls of ivy, whether I would use it, is an x-ray cassette with a grid in front for working through massive tissue on the forearm, the neck, the leg. Unfortunately, it costs about 100-plus dollars today.

What about problems in diagnosis? I am going to show you some of the lesions we should recognize, and I know many of you do, things we ought to be able to spot quickly. It helps us in our diagnosis.

[Slide] Sometimes we do not even know where our vessels are. Such studies as this can often help us in our relationship to joint surgery, to know where the major vessels are. This can be done in a stereo procedure, A.P. or lateral procedure.

[Slide] What about the normal vascular pattern within the third phalanx? How many have wondered whether this is a fracture or is it a vascular line. If we know these and know the normal variations, it will help a lot.

[Slide] Notice over in the corner of the base of the lateral cartilage a little notch that exists. That is the site where that artery goes through to the semilunar canal.

[Slide] It is not an artifact. Here it is coming around the side. Notice the vascularity of the planter cushion, how the artery goes completely around. Notice how the arc comes through the circumflex.

[Slide] Normal pathological anatomy, if such a term can be used; perhaps we had better call it "pathology." Navicular bones x-rayed by themselves, with the various manifestations. There is a nice spur, enlarged foramen, for chronic, low grade type of disease. These are pathological specimens, with bursitis behind it.

[Slide] A leg with advanced case of rickets. If we look at the lateral film slide we will notice a paint brush effect at the epiphysis and down here actually bowing of the extremities and digits is beginning.

[Slide] It looks like a fracture but this is a case of osteomyelitis, complete sequestration occurring right through here.

[Slide] This one fooled me. It is a Brodie's abscess of bone.

[Slide] Perhaps we can see now the variation in the cortical pattern between the proximal end of B-1 and the distal end in B-2. Is this one of disuse atrophy that occurs, often seen in bones from low-legged lameness? This is quite easily detectable. Certainly, with any motion, it is out.

[Slide] This one I put at the end because this film looks

like just a high knee. There is the distal end of the radius here. Some of you can faintly see a nipple. This is osteoma. It shows up nicely under good illumination.

[Slide] I think we can all recognize periostitis as such.

[Slide] Sesamoiditis, which is very easy to see.

[Slide] This is from a different angulation. Is this an artifact or isn't it? It is in the cannon bone. Here it is down here. This is a fracture of B-1; a good film. The lateral films are negative until six weeks, when periostitis begins on the front, such as you saw on the lateral fetlock just before this.

[Slide] Dr. O'Connor's bugaboo and mine—fractured splits.

[Slide] Another one. This one I like because this is a problem we see a lot of today, or at least we do in the standard-breds, a fractured sesamoid on this side, a lot of snowballs on the other side. I would like to put this in the realm of pathological fracture. If we took out this fragment, what kind of support would we have? I would not touch that in surgery. Let somebody else do it. [Laughter]

There are many artifacts which, if they are in the wrong spot, which is the spot of critical detail we are after in that film, we have to go back and take again. You all admit that your most valuable ingredient is time.

Have a clean cassette and good dark room procedure and you will eliminate such things as dirty and stained screens, thumb mark, these black half-moon crescents that exist.

Visualization of parts must be adequate and must be covered from at least two angles. That means any joint can be covered from A.P. and lateral median by some devious route or another. In some of these we have trouble. I grant that you have to figure out how to do it.

Last, but not least, eye accommodation. Most of our illuminators are set up for 14 by 17 size. That is the standard human chest film. Most of us take films under 14 by 17, and it is a pretty hard thing to look at a piece of black film in the center, with white all around. Take off that front piece of glass and paint around the edges. If you use 8 by 10, make it 6 by 8. You are wasting the corners anyway. Use the central source of light, with all the extraneous light out of there, and you will increase your vision by 50 per cent. Photoflood reflectors of any strength you want, will help.

Last but not least, we are all in a hurry and read wet films. You must remember that the emulsion on a film tightens up as it dries. I like to take a second look after twenty-four hours. Many times my diagnosis may change between the wet film reading and the dry film reading. [Applause]

INDICATIONS AND CONTRAINDICATIONS

JACQUES JENNY, D.M.V.

Mr. Chairman and Gentlemen: The topic that was assigned to me is maybe one of the more controversial ones but, then, I like controversy.

Indications and contraindications would assume that the subject is already standard, that it is cut and dried. Unfortunately, that is not yet the case.

What I am going to discuss as indications and contraindications might be rather personal viewpoints. As Dr. Delahanty hinted, we might have quite a bit of disagreement on several points. One, however, we will all agree on, bone and joint surgery. The treatment of bone and joint injuries in large animals has gone forward with tremendous strides in the last few years, so much so that it left us, as a whole group, in quite a bit of confusion. Controversy is fine but confusion is something else.

I would like to try to bring out a few points of the standardized treatment, or treatment that we consider today as standardized and, if possible, sketch the trend in the treatment of bone and joint injuries.

I think we should all take a completely new look at that treatment. The relationship that we have established between the insurance adjusters and our profession has to be changed entirely, if we are to keep up with the progress that we have started.

There are any number of examples that I can cite, and that you people have experiences, where our very efforts to advance in the treatment of bone and joint injuries have been short-cut by a short-sightedness, a terrible short-sightedness of the insurance adjusters.

It was the usual thing, a few years ago, to destroy a horse that suffered a fracture. Now there are many fractures in horses that we all agree do not necessitate destruction, for humane reasons.

I would like to ask, where do you people draw the line? We frequently have, among our group in the profession, the response, "Well, you people have to be practical." By "you people" they mean fellows, well, maybe that half of the table here that do not earn a living but are supported by an institution. [Laughter] I suggest that the terms "practical" and "im-practical" be scrapped.

Dr. Armistead, one one of his very excellent afterdinner speeches, once gave a whole list of a new vocabulary in veteri-

nary medicine. Among many things, he mentioned that we do not use "shots" any more; we do not give a "shot" but we give an "injection."

I think "practical" and "impractical" should likewise be exchanged with "indications" and "contraindications."

Now, we might group the approach to fracture treatment into main areas: The treatment of long bone fractures, and then the treatment of the smaller bones, treatment of incomplete or fissured fractures and so-called chip fractures.

I know in talking about indications where we should treat long bone fractures, I am going to stick my neck way out—and I have a long neck. Much work is yet to be done but, gentlemen, if you do not make a start, we can never go very far.

Again, a very practical example. A few years ago an insurance company was in dire need of veterinarian's help, because they had a horse to treat that was insured for \$1,250,000, for which they held \$48,000 as a one-year premium. If that horse in question would have been insured in the \$5,000 or \$10,000 bracket, they would not have cared as much. But there comes the practical aspect. The insurance money was large enough to seek help. If we would have been able in the past to treat similar fractures in any number of cases, we would have had some experience on which to base our treatment. Fracture treatment in all species is the result of a lot of trial and error, and that does include the human being.

The standard reached in fracture treatment of human beings is the result of long experience on one species, *Homo sapiens*.

Small animal fractures do not pose a problem any more, and large animal fractures would not pose the problem they do now, if only we would have had in the past a chance at least to try to treat fractures.

Now, I am not foolish enough not to realize the limitations, but there are many case reports where a fellow has been lucky here and there, and as we have been very lucky in that case I just mentioned. I did write to the insurance company, at the conclusion of the case, that it should not be assumed that in a similar case we would be equally as lucky. That was a case of a great deal of luck and not the result of the application of a standardized treatment.

Besides those case reports, there are very comprehensive reports such as the one made by Kendrick. Milne has shown at the AVMA meeting in Cleveland his work on the treatment of large animal fractures.

At our school, through the help of the King Ranch's, Mr. Kleberg we received a bit of money to do some experimental work.

Suppose a horse develops a fracture on the track. The problem is not so much the technicality of immobilizing the fracture as to bring that horse safely to the point where we can go and immobilize that fracture. We have worked for quite sometime on a first aid splint. We have shown a prototype that we still are working on, at the meeting of the AVMA. I think if we can get a vertical first aid splint, a splint that can be put on quickly by trained personnel at any race track, then we will surely not find any objections from humane societies, if a horse is taken away in an ambulance and then the effort is made to treat that fracture. In the long run, I think the management of the race tracks will be grateful to us, for there is nothing that spoils an afternoon of racing more than seeing a horse destroyed on the track.

The other great obstacle in treating long bone fractures heretofore has been anesthesia. With the advent of efficient tranquilizing drugs, with better use of analgesics in the equine and, lastly, good anesthetic techniques, many of those obstacles are being overcome.

I would propose that we as a group should approach insurance underwriters that, instead of just destroying the horse and forgetting all about it—they own the horse anyway—to let us at least have a chance to try. The horse might be destroyed at the conclusion of our operative procedure, but if among one hundred horses we have saved one, we have at least that one that they would not have had otherwise. With the other ninety-nine that we did not save, we have gained very valuable experience.

As to the procedure to use, it would be far too long to go into any details but in principle, like all fracture treatment, we always ought to keep things simple. I hold that, if a simple plaster of paris will satisfactorily immobilize a fracture, that is the procedure of choice, and not pinning.

We will start with the care of fractures of the small bone. Here the problem is much simpler, of course, since we do not have the tremendous engineering problem we do in large bone fractures. Yet in this day there is a great deal of confusion in our profession as to what treatment is feasible and what not. Hence, since we have confusion among ourselves, the insurance companies are at a loss, and, of course, they have added their bit in exactly the same way as I sketched before. The cases are separated among feasible and not feasible ones, according to the amount of insurance that is attached to the horse.

[Slide] Here is a fracture of the third carpal bone. I would propose that fractures of that group should be treated surgically. It is not my job here to go into techniques, but what we have done over the last three years is to fix such fragments with a screw. It might become necessary to destroy that horse for humane reasons. That happened to be a mare. Since she suffered that fracture, it was decided, "Well, it is a fracture of a small bone. It is not terribly important for weight-bearing. If that horse is just turned out for an extended period of time, nature will take care of it." In most cases, it does. But here it ended up with a joint that could not be completely flexed, not completely extended. Since it is a front leg in a brood mare, it was a case where the horse had to be destroyed.

[Slide] Here is a somewhat similar fracture, little bit smaller, but the size of the fragment is really not important. Again, a fracture of the third carpal bone.

[Slide] The same thing here, a fracture of the third carpal bone.

[Slide] You notice, when we flex that joint in a fresh case, the fracture line disappears. In other words, flexion will press that fragment so close to the third carpal bone that the fracture line can be demonstrated with difficulty on radiographs.

[Slide] In that position, if we fix it with a screw, you can see the head of the screw at the lower border of that third carpal bone, then we very definitely forestall arthritic changes such as you witnessed on the first slide.

[Slide] Here is an older fracture of the third carpal bone. We like to operate on those cases around the tenth day, ideally. Every two weeks that you depart from that ten-day optimum time, the chances of success will become smaller, and obviously so, because once that fragment, in that displaced position, is not immobilized correctly, it will set up arthritic changes.

[Slide] However, under flexion, we had to open the joint in that case and immobilize it properly with a vitallium screw. In the previous case, where we had a fresh case to operate on, we did not have to open the joint. The screw could be placed without losing one drop of joint fluid.

[Slide] Splint bones we all accept, naturally, as a standard thing. A splint bone that is fractured is best removed.

[Slide] If we remove it, I would suggest it be removed high. In other words, the splint bone should be removed at the point where it is closest to the third metacarpal bone, not at the fracture site. In many cases, that will necessitate putting the horse on the table. Personally, I am not enough of an acrobat to do that standing. I like to do them on the table.

[Slide] If a fractured splint is not removed or fired, as we get it many times, they possibly make a union, but a union that can inhabit quite a bit the movement of the suspensory ligament. I just put this slide in to show you where we would remove such a fractured splint bone.

[Slide] You see, we beveled the proximal end of the splint bone off and made a smooth union with the MC3.

[Slide] Incidentally, we always remove those fractured splint bones subperiosteally. Here is a fracture of the proximal border of the sesamoid. In contrast to the slide that Dr. Delahanty showed you, that is an actual fracture.

[Slide] If let alone, that might be the outcome. That looks, of course, like sesamoiditis, but sesamoiditis of traumatic origin, a proximal third sesamoid fracture that has not been treated by surgical removal.

[Slide] I put that slide in just to illustrate what I mentioned in the beginning, that we have a certain degree of confusion in our profession on the subject of what constitutes a case that has to be destroyed, for humane reasons.

That was a case that I had to look at for an insurance company, because it was felt that the horse should be destroyed for humane reasons. I think they would have a hard time finding people to agree to that. What would be done with a fracture of that type, conservative treatment or operative treatment? Well, that is another question.

[Slide] We have removed fair size pieces in the proximal end, such as that one.

[Slide] You see here, after removal, there is a good bit missing. Yet there was a decent amount of suspensory ligament attached to that sesamoid.

[Slide] Here are fractures of the lower border, a very innocent looking fracture. It is quite tempting to leave that alone.

[Slide] However, many times, if you re-x-ray such a case a few months later, and Dr. Reed has demonstrated that in his paper very nicely, you find probably the fragment is quite a bit displaced, decalcified to a degree, but never disappearing. Suppose that fragment is here for any length of time. Again, it acts as a foreign body, and it will stir up a good bit of traumatic arthritis.

[Slide] Another one, a very innocent looking fracture. You might ask, "Why do you operate on that?"

[Slide] Here is what came out of that innocent little fracture. Many small bits of bone.

[Slide] Here is a comparison between the preoperative and postoperative picture of that lower border sesamoid fracture.

[Slide] That is probably about the largest piece that we have ever removed. The horse has not gone back to training yet. I am anxious to see just what will happen in that case. I think that might be the limit as to what you can safely remove in the distal third fragment.

[Slide] There is the postoperative picture.

[Slide] That is the horse's leg. I can gallop that horse for you and can jog him at any time. He is absolutely sound. Whether he will stand racing is another question. But, you see, that brings up the point just what is indicated or not, and a great many of you might very disagree with me if I make the statement, the fact that we cannot, with operative procedure, bring a horse back to successful racing, does not mean that we should not operate. In other words, that does not, in my mind, constitute contraindication. It might be impractical for this time, but it is not contraindicated.

What I mean to say is that you only do good work if you do a lot of it. Unless we can do a lot of it, we will never become proficient.

To further the point of what is practical or not, let me just tell you what happened to me in 1941, when I was in Zurich. I worked there with a physician on intramedullary nailing on dogs. I invited my dear old professor to one of the hospitals where we wore caps, masks and gowns. He looked at me with a little bit of pity in his eyes and said, "Young man, I appreciate your enthusiasm, but that sort of thing will never be practical in veterinary medicine."

Gentlemen, how many people do intramedullary pinning in dogs now, in a span of ten years? I would like to throw that out to encourage you to be a little bit impractical, and separate practicability from indications and contraindications. Do not mix up the two.

[Slide] I put that slide in because it showed that we had to improvise on a horse with a comminuted fracture of the metatarsus. That horse could not be anesthetized; it would not consent to being put on the table, or even completely anesthetized to put on a plaster of paris. We had to make a mold of that foot. We made a plaster of paris impression and, from that, the positive, and then a plastic slipper which we could clip very quickly to the foot.

[Slide] You see that foot plate could be clipped on in a matter of minutes or seconds. Plaster of paris was applied from just below the hock to the fetlock area. Within that plaster of

paris jacket, we had imbedded two pipes with set screws. Through the pipes would then go the supporting steel bars from the base plate upwards.

What I meant to illustrate with that slide is simply the fact that, whenever possible, we should use simply procedures, and we can, with simple procedures many times, get just as good, if not better, results than with involved ones.

[Slide] Here comminuted type fractures of the radius. That comminuted type fracture of the radius was immobilized with transfixion pins, more or less the procedure which Kendrick has described. Then, for support, steel bars on both sides. That was just a yearling.

[Slide] In the A.P. view you see the steel pins going across, with respective fragments, and then the fixation bars on the side. That was just a yearling, yet, coming out of anesthesia, he managed not only to bend the transfixion pins but also move the fragments. We tried to readjust it, but finally ended up destroying that horse. Nevertheless, it was a loss, but if we keep on trying, sooner or later we will have eliminated all of the "bugs." If we do not try, we will not eliminate them.

[Slide] That happens to be a bovine. It was a fairly heavy heifer, again, with a comminuted type fracture of the tibia. Actually that is the second slide, already showing a considerable degree of union. In that particular case we were successful. That heifer made a fine recovery. It was so frisky, it ran away from the student that was leading it; slipped and broke the opposite tibia, and the femur on that side. You might think it is discouraging [Laughter]

[Slide] That is the original x-ray of the fracture that we just showed. It was a fracture with considerable displacement of the comminuted pieces.

[Slide] Here is a procedure that we have worked on experimentally with the Kleberg fund. We made that fracture. Dr. Raker will agree with me that it was probably the most disagreeable experimental work we have done. The horses were destroyed right after the fixation was made. We kept one for about a week. But what we learned from that procedure is that we can get an absolutely stable osteosynthesis. Maybe we were clumsy but we had to keep trying to drive the Rush pins in so that they would lend stable support to that fracture. We had x-rays that would show Rush pins going in almost any direction. Again, what we did experimentally, has helped so-and-so many horses. One time or another we make our mistakes. But since a few horses are destroyed through the year anyhow, I still feel that it should be possible to let us make our mistakes on the horses that would be destroyed anyhow.

[Slide] Here is the specimen of such a fracture. One pin introduced from the medial side, the medial styloid process of the radius, one from the lateral. We can also drive one through the tip of the olecranon. We have three steel pins, all in different directions, according to the Rush principle, giving support by the spring action within the marrow cavity.

[Slide] Here is a sample of an olecranon pinning. We simply drill a hole from the tip of the olecranon to the point where it fuses with the radius, and we are right into the radius; drive the pin in that way. That one single Rush pin will positively immobilize a fracture at the base of the olecranon.

[Slide] Here we reach the end with that slide that we started to work on. You notice here the extended branch of that horseshoe that could not be attached to the foot by nailing. We had to clip it to the foot with a plastic plate. We had a denture type plate made up at the dental school, with elongated heels imbedded into it and, from the heels upward, the steel bars supporting. The horse would pick up the foot at fairly regular intervals, about once a minute, and we could get perfectly hard plaster of paris from just below the hock to the fetlock. We could not go beyond, because of the movement.

Once that jacket was made and the pipes imbedded, we simply had to go and put the foot clip on, slip the steel bars in, tighten the set screws, and the fracture was immobilized.

As additional support, we put plaster of paris over the fetlock area. At that time, the horse could pick up the foot, without being able to move the fetlock area. So, we could put the plaster of paris on.

I am afraid I have taken a little bit more than the time allotted to me. I want to thank you. [Applause]



OPERATIVE PROCEDURES AND TECHNIQUES

WILLIAM O. REED, D.V.M.

It is not our purpose to give surgical techniques per individual operation, but to mention certain things which may be applicable to any, or all, orthopedic procedures. We of today have become so accustomed to accept and to use the expertly made instruments and techniques of our profession that we find it difficult to imagine surgery being performed without them, yet surgery has become a science in human medicine only in the last 150 years and in veterinary medicine in much more recent time than that. Its development was made possible not so much by improvements of individual skills, as by the introduction of such factors as anesthetics, antiseptics, the study and control of bacteria, and precautions against shock. The practice of aseptic surgery demands a strict observance of pre-operative sterilization of surgical materials and a pre-operative cleansing of the operative area, of rigid adherence to the ritual of cleansing hands and arms, and of strict observation of aseptic principals during the operation and afterward, until the wound is healed. The success of an operation, including the quality of healing of the wound, the amount of local or constitutional reactions, and the discomforts experienced during the days following the operation, depend not only upon the skill of the surgeon, but also upon the care exercised in all procedures pertaining to the patient. Simplicity should characterize all aseptic procedures, and methods adopted should be rigidly observed.

An important consideration is pre-operative techniques and procedures. With the advent of certain drugs such as Demerol and Tranquilizers, the anxiety status of the injured animal may be greatly reduced and further damage to the tissue kept a minimum. We feel this to be extremely important. Consider the horse that may be injured and through excitement damages himself completely beyond surgical repair. This applies even to the simple types of fractures. Many of the so-called simple or Fissure type of fractures may be badly comminuted through excitement. Few patients do not respond to the use of tranquilizers, which enable us to temporarily immobilize the animal, return him to a stable, either by way of horse ambulance on the race track, or other methods on the farm. When kept in such a stable he may be properly prepared for surgery. Much of the failures of surgery in a horse may be attributed to hasty surgery on a somewhat 'hit or miss' basis. For some time it has been thought that speed was the first requirement to good

surgery in a horse. Perhaps this feeling originated as the result of the fear of the Veterinarian becoming injured himself. Another reason is that in many cases the Veterinarian attempted and attempts to do certain surgical procedures in a standing position, rather than completely immobilizing the animal to the point where he did not force himself to do certain types of acrobatic surgery. It is our feeling that any surgery which is simple and for which it is unnecessary to completely immobilize the animal should be done in a standing position. We do not believe that extensive bone and joint surgery can be performed in this manner. We also feel that is not a credit to the the profession to attempt to do such, reasons for this being simply:

- #1 Aseptic Technique cannot be completely followed.
- #2 A moving target is never a good target. Irregardless of how well the animal is under local anesthesia, there is always the possibility of motion during certain procedures.
- #3 Adequate ligation of blood vessels is impossible. This we consider to be very important. Much of the post-operative swelling and enlarged legs are the results of inadequate hemostasis.
- #4 The actual technique itself: Many times this entails judgment at the time of the surgical procedure. Example; What may appear to be a certain type of chipped fracture on an X-Ray, may be entirely different when the field is entered. This sometimes complicates the situation greatly. Where a simple removal of a fragment had been intended it may be desireable to use a fixation device.
- #5 Better closure of the operative area can be produced. This does not apply so greatly in skin suturing, as it does in buried sutures where better coaptation of tissues is possible in a properly restrained animal.

Aside from the general pre-surgical treatment of the patient such as laxative diet, preanesthetic medication, certain pre-operative procedures are necessary. Many times it may be indicated to thoroughly scrub the operative area and apply a pre-operative pack prior to surgery. This is frequently done in human surgery, particularly if there is a chance of any infection or break in the skin at the pre-operative site. The actual pre-operative consideration is complete clipping of the hair over the operative area. It is our feeling that a #40 clipper blade permits close enough clipping and eliminates shaving of the hair. We do not like to shave the hair because of the chance of scraping the skin and causing irritations, which may react unfavorably.

A thorough scrubbing of the operative area with an antiseptic scrub soap, such as Phiso-hex, is definitely indicated, and the importance of this can not be underestimated. There is a great tendency to scrub a couple of minutes and paint with an antiseptic with the complacent feeling that the antiseptic will take care of the situation. Personally, I feel that the scrubbing is much more important than the application of the antiseptic. A pre-operative antiseptic, such as Zepharin, Metaphen, or Methiolate may be used immediately prior to surgery. At present, surgical technique has evolved into the aseptic method and certain general principals governing this method should be thoroughly understood by all who attempt either manipulative or cutting operations. It is known that when the edges of a surgically clean wound are carefully coapted and kept at rest prompt healing by first intention will ensue, unless the wound is invaded by certain species of bacteria (the Pyogenic group). When such are present to any extent, inflammatory signs will be manifest which delay and prevent healing. Living tissues possess a natural power of resistance to infection depending on the individuals general resistance, and it is a part of surgery to strengthen this natural defense as much as possible. Prevention of wound infection further demands that everything used in the performance of an operation must be germ free, and that the field of operation should be protected from contamination by the operating personal who come in contact with the patient. The thoroughness of sterilization, the care exercised by the operating surgeon and his assistants must be to a great extent, a matter of surgical conscience and personal responsibility. The care of the surgical armamentarium can be reduced to a routine mechanical process; there are methods to accomplish this. The use of sterilized rubber gloves is imperative. Though there is no known method of keeping the hands absolutely sterile, the use of rubber gloves must not prevent the fullest and most detailed preparation of the hands before they are thrust into the gloves. The use of masks, caps, and operating gowns, are perhaps looked on as being superfluous, but with the value of the horse involved, this is not so. The elimination of any infection which might be caused by lack of complete sterile operating apparel is certainly self-explanatory. A minor reason, but one which we cannot overlook, is the occasional presence of a human surgeon who may drop in at the request of his friend, the owner of the horse. We have this happen often. Use of masks is important because airborne bacteria from the mouth and upper air passages are likely virulent. We, as a profession, cannot afford to be a target as a result of our own carelessness or indifference. The actual time involved in putting on sterile gowns is negligible, the expense is negligible, and consider the possibility of touching an operative area with ordinary coveralls, which are not sterile. We thus endanger

our success of our operative procedure. Use of drapes to protect the operative area against contamination is a must. Many choices are available. One choice is to use a sterile stockinette, covering the leg and simply incise through it. The stockinette may be either sewed to the incised margin or held in position with Michael clamps. Another choice is to use cloth draping, covering the entire area and held in position with towel clamps. In human medicine an Orthopedic surgeon may become drastically upset if a skin contact is made into the operative area itself. Plastic drapes such as are made by the Scotch Tape people, are impervious to fluids and act quite well. At present we are using a drape made by the Vi-Drape people, which is transparent plastic material and is applied by spraying an antiseptic adhesive lightly to the skin and applying the drape with slight pressure, then covering the adjacent area with ordinary cloth drapes. This material is easily incised through, does not prevent good touch to the surgery, and gives skin margin contact without the necessity of using towel clamps, Michael clamps, or any other fixation device.

One of the things which has assisted us materially for controlling hemorrhage, is the use of a Carter ring dispenser. This is a spiral wound spool, which may accommodate any size desired. We have been using double O silk for some time for blood vessel ligation with good results. The Carter ring dispenser enables one to use one-handed ties on the hand opposite the one with the dispenser, or two-handed ties, if desired. It is our feeling that this has been of considerable assistance to us. For skin closure we prefer stainless steel. There are certain disadvantages to the use of stainless steel such as the tendency toward puncturing rubber gloves, it is not the most rapidly applied suture material, but the over-all satisfaction with it has been superior than usage of any other suture material. For post-operative care we prefer to use nothing but sterile dry gauze sponges for dressings and we find that the use of a material called Kling, lends itself very well since it is adherent to itself by way of its weave. Skin sutures are removed in approximately 6 to 7 days. It is our feeling that observance of these principals permit us to perform more satisfactory surgery and that the end results justify the efforts involved.



TECHNIQUE AND RESULTS

J. D. WHEAT, D.V.M.

I am going to confine my remarks to surgical procedures involving the fetlock, carpal and hock joints in the horse. With regard to sesamoid fractures, I do not believe in operating on these unless there is an actual separation between the bone and the fragment. In fissures and small cracks through the bone, without separation, usually do not operate on them but immobilize them with plaster of paris cast, and allow them to heal.

I think it is advisable to follow these along with x-ray examination every two weeks, to make sure that they do not separate after that initial period, because as Dr. Jenny mentioned, fractures on the distal portion of the sesamoid bone, some of them look pretty good when they first occur, with close opposition, but over the period of a few days you will get separation, pulling apart, and you end up with an animal that is useless for racing, unless that portion is removed.

As far as technique involving these fractures on the proximal sesamoid bone, enter the joint through the proximal pouch of the fetlock joint capsule, the same place where we enter to aspirate the joint in case of infection. That gives good exposure to the proximal fractures.

In the distal portion, my approach is between the deep flexor tendon and the sesamoid bone, incision through the skin and annular volar ligament; reflect the digital flexor tendons, and with the fetlock joint slightly flexed, you can retract the tendons out of the way in good shape. That exposes the intersesamoidian ligament.

You find in recent fractures many times there is already a break in this intersesamoidian ligament. There has been a good, severe fracture, with separation. This intersesamoidial ligament will be injured or broken at the point of the fracture. If it is not ruptured at that point, by palpation you can easily feel the separation between the body of the sesamoid bone and the fracture. That gives you your site of incision. We simply make a transverse incision along the line of the fracture, go in with a pair of sharp-pointed dissecting scissors, free the fragment, grasp with forceps, and carefully separate it from the surrounding tissue, and remove it through that incision. Suturing of this structure can be done with a fine, half-circle needle. You should be careful not to traumatize the structure excessively during the removal of the chip. Careful dissection comes in there. You do not want to go in with a pair of scissors and start whacking away and expect to have the piece out of there and still have

anything left to suture. You want to maintain the continuity of the intersesamoidian ligament. That is sutured with 0 to 1 chrome catgut. Then, of course, the annular ligament is sutured, and subcutaneous tissues under the skin.

The thing that I want to mention is that, in any of these sesamoid fractures, routinely take a postoperative x-ray picture, before closing the wound. In some of these you feel that you have all of the fragments removed. You take a picture through the area, only to find that there is another little piece of bone in there that still has to come out. That has happened more than once. I feel that that final picture, before you close the wound, is very important. It is discouraging to get one off the table, take a picture the following day and see a piece of bone still sitting in there. If there has been hemorrhage into the joint or bone dust has escaped in the joint, I think it is very important to pack the joint off in the first place and prevent these from getting scattered through the joint space or, otherwise, to flush the joint with a saline-penicillin solution before closing the capsule. This is done with a rubber bulb syringe, and the use of sterile saline with crystalline penicillin added to it. That is used to thoroughly flush the joint out before closing the capsule.

I mentioned in suturing the joint capsule, use an atraumatic half-circle needle, with either 0 to 1 catgut, depending on the thinness of the tissue you have to work with, or the stress that is on it. That will pretty well determine the size of the gut. The smaller diameter gut causes less trauma and tearing that goes through the tissues. For the most part, we try to get by with 0 gauge.

As far as the aftercare, try to keep the joint aspirated. If it fills up, aspirate the synovial fluid. Encourage new synovial fluid coming in, with possible added antibody and healing effects that you get from new synovial fluid coming into the joint space. Also, by removal of fluid, you cut down on pressure in the joint. By doing that you also relieve the soreness.

If you do use pregnesilone in these cases to help cut down on the inflammatory reactions that occur, use it systematically, 100 mg. per day for the first three or four days, plus antibiotics, usually a combination of penicillin and streptomycin.

Try to start exercising these animals as soon as they will start putting weight. I do not mean to get them out and jog them around the barn, but take them out as soon as they can start stepping on the foot, they can use it. You will notice quite marked improvement. Start exercising them about the third day.

You can set up a bandage, not use a plaster cast on these, because of the fact that swelling may occur, and you get pressure

necros's. Furthermore, you should have daily wound inspection. I have never felt it necessary to cast these following surgery.

But I do think with these horses that stand around the stall, are not moved out, exercised, they are allowed to stay in there two weeks and not forced to move that leg, you are apt to end up with one that is fairly stiff and not functioning. You may disagree with me on that, but that has been my experience with those cases.

The question is how long to rest them. A lot depends on the animal's response as to just how well he starts going sound, how he does it while jogging in rope, responds to paddock exercise.

On fractures involving the dorsal and proximal fragments, you can figure on a minimum of three months' time on those. Those on the ventral aspect usually take a little longer to come back.

On some of the animals, you will notice that the joint remains a little bigger than normal. Sometimes a little fibrosis starts in the area of surgery, although that does not seem to cause any unsoundness or difficulty. There are some that have hesitated to put full weight on the leg for a month or two following surgery. If you flex them, work the joint, they show a certain degree of soreness. If you take them out, they favor the leg. The thing looks good on x-ray. There is no excess calcification developing. With some of those you do about as well with forced exercise. Ultrasonic therapy over a period of time on those will give you quite a bit of loosening of the joint and get some of those animals going sound.

We had one a while ago, that we did last summer. That horse had a ventral fracture that came out very well, healed up good. X-ray pictures over a period of time showed no exostosis or calcification of surrounding structures, yet the horse would not extend himself, would not put weight on it. We tried blocking the leg and tried injection with pregnesilone, with very little, if any, effect.

We started this horse on forced exercise and ultrasonic therapy over a period of about a week, and they are now able to take the horse out and start ponying him, with no apparent lameness. Whether or not he will be able to make the full training. I do not know.

The carpal fractures, free bodies, little osteochondromas that occur along the margin of the joint, one of the main problems, I think with these, is to make an accurate determination of the exact point of injury, with incision where you want to make your opening. Take a lateral medial view of the carpus, and you can see the free body sitting out there very plainly, yet

to determine exactly where to make the incision on these is a little different matter. Sometimes an anteroposterior view does not help you a great deal. But by careful palpation, and you can take two or three different anteroposterior x-ray pictures, changing the angle, the position of the knee, the flexion in time you will usually get one that will point that area out.

There is not too much concern on these complete fractures where you have a complete piece broken off from the intermediate carpal. It is more the small free bodies sitting on the edge of the joint margin that give a great deal of pain at certain times.

In this type of fracture, as soon as one is located, make a vertical incision directly over the area. Try to avoid the intercarpal ligaments. If you can, incise to either side of the ligament and still be close to the body. I prefer to do that. Otherwise separate the ligament, and do not cut transversely. Try to keep your incisions in a vertical direction as much as possible.

Small fragments usually fibrose to the margin of the joint. You find some that are actually free and movable but the majority of them have a fibrosed attachment. They remove easily. With a half round chisel, you can easily elevate them and not do damage to the surrounding structure.

One thing in working in a joint with any dissecting instrument or chisel, have the hands well braced so that, if the thing moves, you do not gouge into the articular cartilage, which easily happens. You should be well balanced and not use excessive pressure. Otherwise this might occur. If you gouge a piece of cartilage loose, that is apt to set up another free body in the joint and result in excessive damage. After removal of these fragments, you should take a postoperative x-ray picture to make sure that you have everything removed that you want to get out, because there may be two or three pieces that have not shown up plainly on the film. They may appear to be just one large body. When you get in there and remove one and then explore the joint a little more carefully, you find that it is actually made up of two or three pieces, and you have further ones to remove. Actually, I think the carpal joint is easier to go into than the fetlock. I would rather open a carpal joint and go in for a bone chip or free body than I would to enter the fetlock.

There, again, the joint capsule structures are sutured with O chromic gut, and the skin is sutured with non-absorbable suture, either Dermalon or Vetafil.

Aftercare consists of aspirating the joint to prevent excessive synovial fluid collection and swelling, plus the systemic administration of antibiotics. These animals can usually start exercising the following day. Take them out, move them a little

bit. They will be quite sore, but notice how very rapidly the lameness will disappear. Usually, by the end of a week's time, the animals will be walking soundly.

The incision in the knee, if you can work through a vertical incision, I think it is advisable to do so. There you have less tension on your suture line and less chance of its breaking open.

If you have to make an extensive horizontal incision, there is the danger of the animal flexing the knee and breaking the sutures, especially when coming out from under anesthesia, or getting up. The horizontal incision is placed under a lot of stress and is apt to break open.

On the hock, occasionally you see these free bodies in the hock joint, particularly injuries to the trochlea, the tarsal bone. They act as a foreign body, cause pain, and require removal. The hock joint is rather limited, as far as good access to it. Usually make a vertical incision over the joint capsule, at the same point of distention, where you get a spavin in the anterior medial distention of the hock joint capsule. That gives a fairly good area of entrance. By careful digital palpation, you can go in and usually palpate these little osteochondromas, free bodies, chips on the trochlea, and remove them. There you have to work with either a small bone chisel or rongeur forceps, to free the fragment, and be careful not to lose it in the joint. It is quite a fishing job to go in and try to find those, if you happen to drop them in the joint space itself.

As far as results, a person can vary the results quite a bit by selection of cases.

I think on sesamoid fractures, if you would limit yourself to a few very recent fractures, involving the proximal portion, you can come out with a much higher percentage than if you take them all as they come. I think only by going into all of these can we actually collect figures as to how successful joint interference is.

I think, for the best results, we should get these cases before fibrous reaction occurs and the bone starts to decalcify.

However, we had some of the older fractures in horses that have actually been laid up, gone back into training and continued sore. We operated on them at that time and have managed to get two or three of those back into training and racing. Percentage-wise, however, we are not too well off. I think we have had a little better recovery on the proximal fractures than on those on the distal surface, less trauma possibly. So, we have been able to get those under way a little more rapidly.

It is rather hard to collect accurate figures on the exact recovery, as determined by the horse's ability to return to

successful racing. These horses move around the country, are sold, and it is hard to keep track of some of them.

I think probably one of the best ways to keep track of these is through the Racing Form. You find horses that you worked on have ended up on the East Coast or Caliente. You never hear of them again unless you just happen to see them listed on the Form. So that there you can pick up additional information.

The ones we have been able to check up on overall recovery, including proximal, distal sesamoid fractures, and fractures involving the distal portion and the proximal portion of the bone, plus the long-standing cases in which lameness has persisted, have been about 50 per cent. However, if you break that down into recent cases, we are approaching closer to 75 per cent recovery, as against about 25 per cent on these older fractures that have had a chance to develop fibrosis and some excess calcification around the area.

As far as the knees, we have done 7 carpal fractures. Three of these are back racing; one horse went bad on the opposite leg, went back in training, and he is laid up with that. We have three that are still resting. We do not know what the outcome will be on those.

[Slide] Here is a rather typical type lesion that you see in a horse with an injury to the fetlock joint, right where the collateral ligaments attach. He had a pulling loose of some periosteal bone, and proliferation that caused pain, particularly on turning.

Sometimes they will go along quite sound. All of a sudden, the horse will make a step and show considerable soreness. Sometimes it will pull up lame.

[Slide] This shows the value of flexing the joint. Notice that that portion shifts. That is one reason why you should take some of these joints in normal position, as well as flexed, to determine whether it is attached, how well it is attached, or whether it is just a free body in the capsule attached to the ligament.

[Slide] This shows a view of it immediately after removal. This was taken out of there. The horse was given a couple of months' rest, put back to work, and he has been sound ever since. It is a very simple thing to remove. Just a vertical incision, and a minimum amount of trauma to the tissues. With that one there, we were able to get a little half-round chisel under it and lift it out with a minimum of dissection.

[Slide] This is a lesion in the hock joint. This horse will be lame for several months. See that body there? The question

in our mind is whether or not that was the cause of the lameness. However, we could find nothing else. We went ahead, under this joint, and removed that portion. It was a little piece off the bottom of the trochlea.

[Slide] This shows it immediately after removal. We took the picture while the horse was still on the table. The joint was still open. Again, that piece had more or less of a fibrous attachment, and we were able to lift it off. After that, this horse was sound and raced successfully all summer.

[Slide] This is the type of lesion that we sometimes see in the carpal joint. That again is a little evulsion type fracture, a piece out of there.

Here, again, this is a horse that periodically he would be going all right, and all of a sudden it would hurt him. He would pick the leg up, stand there and hold it. I think some of those, unfortunately, must get in the articular space and pinch them, the way they act.

[Slide] This is an anteroposterior view. It is rather difficult to pick those up on an A. P. view. Sometimes, by over-exposing or by taking two or three films at different positions, you can isolate the area, but the main problem with these is to be able to come right down on top of them and have your incision so that you are directly over the lesion. The thing is to have a minimal amount of trauma. It is important to try to get an anteroposterior view to show the exact location of the lesion.

[Slide] This is another picture. This is another horse where we had the joint opened and went in and removed a portion. Then figured we had better take a second picture before closing the joint. That is what we found, that piece right there. There happened to be another one just the other side of it. We had not palpated when we were in there and realized it was there. So we went back and lifted that portion out, also.

[Slide] This shows the horse about a month afterwards. We did get a little roughening there, but it has not progressed any further. You probably sometimes run into those and you get a continued exostosis at that point. The same occurs in some of these sesamoid partial removals. The operation goes along fine; the piece comes out. Then two or three months later you take an x-ray picture and you have a beginning exostosis or calcification in the suspensory ligament. I do not know the complete answer to that problem, how to prevent that.

[Slide] Here is another fracture, showing the location of this body, right in close to the articular space.

[Slide] That shows the joint flexed to give you a better idea of the location, whether that is freely movable or attached

by fibrous attachment here in the margin of the joint. Most of those I think are little evulsion fractures off the rim of the joint, and sometimes osteochondromas, free bodies. Most of those remove rather easily. After you have the joint incised, open, you can get in there and lift them out very easily. You might have a little fibrous attachment that is carefully dissected loose. You produce less trauma in removing these than you do with a fragment of the sesamoid bone.

[Slide] That is an anteroposterior view of that same knee. Here, again, the difficulty we encounter in trying to spot those in this particular position. [Applause]

DISCUSSION

MODERATOR RAKER: We have five or ten minutes for discussion. I am sure there must be some questions.

DR. E. W. THOMAS [Lexington, Ky.]: What would you recommend for treatment of osteochondroma of the second metacarpal bone without a fracture?

MODERATOR RAKER: The question is, what treatment would you recommend for an osteochondroma of the second metacarpal bone. Dr. Jenny!

DR. JENNY: As Dr. Proctor said last year, take it out. I would very definitely remove it. At what location of the second metacarpal would it be?

DR. THOMAS: The proximal.

DR. JENNY: Very proximal? How close to the carpus?

DR. THOMAS: An inch and one-half.

DR. JENNY: That is good enough. As long as you have about an inch of the proximal end of the metacarpal bone, you are surely safe to take it out. You do not get a tipping, similar to what you find with atresia of the fibula, where the upper fragment in the fibula, if you can call it "fragment," will tip. Didn't you have a case that you removed very high in a fractured splint?

MODERATOR RAKER: Yes.

DR. JENNY: It is the same thing. You would just treat that as you would the removal of a splint.

DR. J. D. CHASSELS [Brampton, Ont., Can.]: I was up to visit Mr. Cardy on some work, and the grooms up there showed me a horse that Dr. Jenny had operated on, that had a fracture in the hock. These boys told me you had injected a plastic bone into the hock. They did not know much about the details of it. I just wondered if you could tell us about it. I was very much interested.

DR. JENNY: That was a chestnut horse that had a fracture, an avulsion fracture of the lateral malleolus of the tibia. The horse was shipped over from England for one race in New York and tangled up with the starting gate. It came back to Unionville with a huge hock. What we did was remove the lateral collateral ligament which was pulled into the hock. I have a slide of that case which I will be glad to show you. The horse ended up with a fairly big joint, but he did go on and race, and win, both on the flat and over jumps. So, his hock must have been fairly functional. No plastic bone was injected. [Laughter]

DR. O. R. ADAMS [Fort Collins, Colo.]: We often have calls to remove blemishes from the cannon bone, sometimes from the phalanges, as a result of previous injuries. These are healed blemishes, smooth on the surface, to x-ray. The owner wants them removed, for show purposes. What is the panel's opinion of this?

MODERATOR RAKER: Which one of you gentlemen would like to answer? Dr. Wheat!

DR. WHEAT: I have not run into those.

DR. REED: I would be a little reluctant to fool with them. You might set up a lot of periostitis around there. I guess you could take a bone saw and angulate down and "V" it off. I would be reluctant, unless you did a complete removal of the whole thing, subperiosteally.

DR. ADAMS: That is the opinion we had.

DR. JENNY: I would be very reluctant to do any bone surgery for just esthetic reasons.

DR. ADAMS: We have left them alone because they were not causing any damage. We will take them off if they are impinging on the suspensory ligament.

DR. JENNY: We had splints that were very unsightly and impinged on the suspensory. There is a fairly thick structure. You incise that, peel it back with a short periosteal elevator, and remove the bone underneath. You have a thicker bone but then you have thicker bone all around. So that to the lay person, from the front view, at least, it looks nice and even. [Laughter]

MODERATOR RAKER: I think, as far as splints are concerned, this may be true, but I think when you start doing that for blemishes, you are up against a difficult problem. I do not say it cannot be done but I would be hesitant about it.

DR. L. S. McKIBBEN [Wheatley, Ont. Can.]: I have removed splint bones, a few high and a few low. When you remove the high ones, the suspensory seems to get wider, for some

reason, or the tissue around it does. That is one disadvantage. Then we have the others where this exostosis comes, where you cut it off.

I had an owner say to me, "The next bone you take out, take the firing iron and drill the end, and try to discourage the growth of more calcium."

MODERATOR RAKER: Delahanty, what is your opinion? I know you have taken out quite a few.

DR. DELAHANTY: I use a little different technique than Dr. Jenny described. I take out everything as a block incision. I do not try to do a subperiosteal resection. Periosteum will often regenerate rather rapidly and put new bone back in the area.

I have one more trick up my sleeve. I do use a little x-ray therapy on the periosteum afterwards. I think it helps, about 500 roentgens, in two doses.

DR. THOMAS: I did not hear you mention tourniquets. Would you recommend them?

MODERATOR RAKER: Dr. Reed!

DR. REED: I do not think so. I think you fool yourself when you use tourniquets. If I have hemorrhage, I want to know it; I want to control it as quickly as possible. I think much of our exostosis following surgery is the result of post-operative hemorrhage. Look up an article called "Transplantation of Tissue" by Peck, in which he discussed that fully. There is a very good reason, physiologically, for that. I cannot give it to you right now. If you put a tourniquet on, you have a beautiful field to operate in, I grant you that, but if you take the tourniquet off, here comes a lot of hemorrhage, little, tiny bleeders that you did not recognize before. I like to get those tied off well in advance. I think that makes a much nicer looking job afterwards. You do not have the postoperative hemorrhage, enlargement of the leg.

It is nicer to operate under a procedure where you have a tourniquet, and a completely dry field. If you want to do that, I think the answer is to use an aspirator while you are doing it.

DR. THOMAS: You do think you save that much time, by putting the tourniquet on, and then trying your vessels after you have completed your surgery?

DR. REED: No, many of your vessels, in the meantime, thrombose. They do not show any hemorrhage until you put weight on, until the blood pressure is increased. Many times your blood pressure will be diminished during surgery, after surgery, the blood pressure will kick back up, and then comes your hemorrhage. I feel the time to do it is immediately, right now.

I have been fortunate enough to watch quite a bit of heart surgery. It is amazing how meticulous they are in tying them off, even the tiniest bleeder. I feel we should do the same thing.

DR. G. M. BEEMAN [Littleton, Colo.]: I was wondering how many days post-fracture do you operate on these fractures of the proximal sesamoids.

DR. WHEAT: We have taken most of them as they come, in order to try to establish any limitations. So far we have had horses with fractures that have been in existence for a year. The recovery rate on those has not been outstanding, but we like to get them within, say, about a week or ten days. Some of them we have gone into the fourth and fifth day. If the joint is edematous, we try to reduce the swelling, the filling out of it, before going in. It depends on how long it takes the extreme swelling to recede. There is always a little filling, but we do not want to try to go into one that is big and hot. I have not put any time limitation on them. We always advise the owner ahead of time, before prognosis. Most of them feel they have very little to lose. "The horse is not any good the way he is, so go ahead."

DR. JENNY: Dr. Delahanty mentioned he would remove a splint bone by block excision rather than subperiosteal resection. We have done both, and I have had a chance to evaluate both. I personally think if you make a clean subperiosteal resection, the end result is bound to be better, but I will make it very clear that it has to be a periosteum big enough and thick enough that you can identify it.

If you work subperiosteally, and suture the periosteum afterwards so that the cambium layer is towards the bone and the limiting membrane towards the suspensory, that is the best insurance not to have any adhesion between the two.

As far as bone production is concerned, if you do not have subperiosteal hematoma, you have absolutely no danger that there is a big knob forming afterwards. I can prove it by radiographs. [Applause]

ABDOMINAL SURGERY OF THE HORSE

J. D. WHEAT, D.V.M.

Many veterinarians today are still unwilling to attempt any surgical invasion of the abdominal cavity of the horse even to perform a castration of a cryptorchid stallion. The old idea that a horse is extremely susceptible to peritonitis is one deterrent. The other is the lack of information on laparotomy technique in the veterinary literature in this country.

Some of the conditions in the horse that require opening the abdominal cavity are intussusception of the small intestine, torsions of bowel, some cases of impactions, eversion of the horn of the uterus in the broodmare, enteroliths, testicular and ovarian tumors and paralytic ileus.

There are three approaches to opening the abdominal cavity; these are the flank, the ventral paramedian and the ventral midline. Each site has its advantages, and disadvantages.

The flank incision can be performed on the standing animal using local infiltration for anesthesia. I have found this approach useful in reducing eversion of the horn of the uterus in the mare when other methods failed and also to massage and break down impactions that had not satisfactorily responded to other treatment. The flank approach has some disadvantages, particularly when the horse is restrained on its side. Among these are difficulties in orienting oneself to structures in the abdominal cavity and limited accessibility to various organs and parts of the intestinal tract. Hemorrhage with a tendency to post operative oozing of blood and hematoma formation that may cause separation and tract formation between the muscle layers is also a problem. With the majority of intestinal obstructions, one is never quite certain of the exact location or extent of the involved area. I have had the unfortunate experience in a couple of cases using a flank approach only to find that I could not satisfactorily reach the area involved. Suturing the flank incision is sometimes difficult due to the thickness of the abdominal wall of the horse and the abdominal pressure that is produced by having the horse on its side. By using the right flank approach it is possible to either expose or palpate the terminal duodenum, the jejunum, the ileocecal junction, the cecum, midportion of the right ventral colon and small colon and right ovary. The left flank approach exposes the exterior ileum, spleen, middle portion of the small colon, pelvic flexure, adjacent part of the left ventral colon and the left ovary.

The safest and simplest ventral approach is the right or left paramedian incision. With this technique the sutures are

not under stress and one can take full advantage of the lines of direction of the muscle fibres. The incision through the skin is made parallel to and a handsbreath from the midline. This exposes the rectus abdominis muscle. The fascia of this muscle is incised and the muscle fibres separated by blunt dissection. This exposes the fascia of the transverse abdominal muscle which is then incised parallel to its fibres. The advantages of this approach is that hemorrhage and trauma to the structures is at a minimum, the danger of postoperative hernia is reduced and the incision can be satisfactorily closed with No. 3 catgut. The major disadvantage is the limited size of opening that can be made. At best the incision will admit both hands at one time, but leaves little room for manipulation. For greater exposure this paramedian approach can be modified by lengthening the incision in the rectus muscle and incising the transverse fascia parallel to the midline. As far as I can determine this latter technique has no advantage over the median line approach. With either method all layers of fascia and muscle are sutured with No. 3 chromic catgut.

The method that gives the greatest exposure and makes the viscera most readily accessible is the ventral midline approach. However, unless care is taken to carefully suture the linea alba and reinforce it properly with removable tension sutures, there is a greater tendency for post operative hernia than with the other techniques. (Illustrations)

Whatever approach you use, there are several things to keep in mind. A liberal area surrounding the operative site should be draped. This applies particularly to both the front and rear legs of the horse that is cast and rolled on its back.

For anesthesia I routinely use a mixture of chloral hydrate, magnesium sulphate, and pentobarbital sodium. When suturing of the abdominal wall commences, I often start administering succinylcholine as a continuos drip in order to get additional relaxation. The succinylcholine also prevents the horse from tensing or struggling and thus breaking the first sutures before enough have been placed to secure the incision.

In regards to suturing the peritoneum, most horses have a rather extensive fat deposit between the peritoneum and muscle or fascia. Some of this fat can be trimmed away, however, as you know fat does not tolerate sutures well and rather than bury sutures in this fat layer and cause necrosis, I am of the opinion that it is not too important to suture the peritoneum. It regenerates over the defect rapidly and subsequent examination of this method has failed to reveal any intestinal adhesion or failure of peritoneum to unite. What suture material to use is always a problem. I do not like to bury non-absorbable sutures in the abdominal wall of the horse because of the possibility

of subsequent suture fistules. For this reason I have stopped burying stainless steel wire. We used to think it could be used without fear of any reaction, but this is not true. No. 3 chromic catgut tied with a square knot and the sutures placed close together will give sufficient strength in all approaches except in the ventral midline. Here it is necessary to place three or four stainless steel tension sutures which are removed in seven to ten days. It is important to eliminate all dead spaces in the incision so as to prevent seroma formation. Good healing is the direct result of good suturing. Postoperative shock frequently occurs when the viscera is disturbed and manipulated excessively. For this reason I routinely administer 1500 to 2000 cc of Dexteran intravenously in addition to intravenous hydrocortisone.

If you plan to do a lapartomy on a horse with an acute intestinal obstruction the decision to do so must be made early in the course of the disease. This is especially true in cases of torsion of the large intestine. Within four or five hours the blood vessels in the mesentery may become thrombosed and although the obstruction is successfully corrected the horse does not survive due to lack of circulation to the bowel. There is one thing to remember about surgical intervention in cases of intussusception and torsion of the bowel in the horse, we have everything to gain and nothing to lose by operating on such cases.

| <i>Condition</i> | <i>Method of Entry into Abdominal Cavity</i> |
|---|--|
| Cesareon | flank or midline |
| Intussusception of small intestine | ventral midline or paramedian |
| Torsion of bowel | ventral midline |
| Testicular tumor | right or left paramedian |
| Ovariectomy | right or left paramedian |
| Enterolith | right or left paramedian |
| Cystotomy | midline |
| Unloading of impacted colon or cecum | ventral midline |
| Eversion of horn of uterus | right or left flank (standing position) |
| Massage and breakdown of impacted bowel | right or left flank |

EQUINE DISEASES AND PRACTICE — THEIR ROLE IN PUBLIC HEALTH

COLONEL CHARLES H SNIDER, USAF (VC)

The role of equine disease and equine practice in public health is not a major one when compared with other groups of animal diseases and types of practice. However, in the light of modern day public health, it is emphasized that roles may quickly change and the contributions of all veterinary practitioners to the health of man are increasing. No doubt some of the veterinary profession, particularly the practitioner, is not aware of his potential to contribute.

At the recent First Institute on Veterinary Public Health Practice held at the University of Michigan, it was significantly pointed out that the veterinarian in public health has come of age. Dr. Leonard M. Schuman, Professor of Epidemiology, School of Public Health, University of Minnesota, who summarized the meeting, said the following: "The veterinarian, for a long time, has made and will continue to make contributions to the public health. But the veterinarian in public health as a career specialist, is a relatively new phenomenon and has but recently completed his initial orientation period wherein associations were made, interrelationships with other disciplines established, workloads accepted, short range goals were set, emergencies were met and immediate problems tackled. During this initial period, lines of communication were established and leadership was spontaneously developed."

To Dr. Schuman, "Public health is not an official agency or agencies but a concept which treats of the total health of the community of peoples as opposed to separate individuals of the community."

The foregoing statements of Dr. Schuman, one a fact and one a concept, cements the role of the equine practitioner in public health. The veterinarian (including the practitioner) in public health has come of age, and where can we find a more closely associated community between animal and man than the stable area of a racetrack, fair grounds or horse show! Granted, as stated in the beginning, the horse's role in public health is lesser than other animals. However, this is no justification for not being alert to any eventuality. There is no assurance that the horse will not be brought into prominence as an important reservoir of some disease for research and newer discoveries are continuously pointing out areas which were not considered in the past. We are rapidly learning of many new bridges be-

between diseases of animals and man and their interrelationships. It is understood that the World Health Organization has increased its listing of some eighty diseases of animals transmissible to man to approximately 110. The increased education of the public to disease, more efficient disease reporting, rapidity of transportation, new drugs and equipment for therapy, and other reasons, place an added requirement on the practitioner to evaluate their effect on man's health and so inform his clients.

Dr. Carey P. McChord, editor of *INDUSTRIAL MEDICINE AND SURGERY*, presented an excellent discussion on "Occupational Zoonoses" at the First Institute on Veterinary Public Health Practice. He pointed out that there are 3,150 occupational diseases; that there are no worthwhile statistics on occupational diseases and that one-half to two-thirds of diseases come about through work. It was his opinion that there are closer to 160 zoonoses than 80. Of particular interest I believe to the equine practitioner were his remarks on new diseases, chemicals and occupational threats to health. There are over 200 new diseases reported each year and every 24 minutes a new chemical or drug is made available. We know when there is something new on the market that it is a good bet you might find it in the tack room or receive an inquiry about it from a client. Ultrasonic machines, diathermy, x-rays, etc., are typical examples.

The foregoing points up that the practicing veterinarian, his clients and other public health professions should be increasingly aware of the relation of equine diseases and equine practice to public health and the contributions which the equine practitioner can make. With this in mind, I should like to confine my remarks specifically to this area of interest.

First, there are some important facts which should be considered as peculiar to the area of interest of the equine practitioner which are:

- I. The show or race horse population of today is an extremely transient group of animals.
- II. These horses are repeatedly brought together into large groups and shortly thereafter dispersed to many points to mingle with new groups.
- III. This transient horse population is repeatedly housed in different quarters often times recently vacated by other horses.
- IV. Man, occupationally associated with the horse, is in daily intimate contact with him.
- V. The racetrack or show community is normally a closely-contained group, within a large community or set apart from surrounding areas.

VI. Horsemen are quick to try any new remedy, procedure or device in the treatment of their stock.

VII. Equine practitioners, as a group, have an excellent opportunity to repeatedly observe or follow a horse's physical condition through its life span.

Many other facts could be added to the foregoing but these are sufficient to demonstrate there are peculiarities inherent in an equine practice which sets it apart from others. From a disease and public health standpoint it is easy to see that the environment of today's equine practice presents a unique and challenging epidemiological picture.

Second, let's consider the diseases of horses known to be transmissible to man and the significance of each. Historically, it can be said that through the ages, diseases of horses have had a diminishing effect on man's health. This is explained by the control or eradication of some equine diseases and a diminishing of the horse population. However, the potential of an increase cannot be overlooked.

Schuman, in his summation on "Animal Diseases and Human Health," effectively brought this out when he said: "For the vast number of diseases of man, whether of human or animal origin, it has frequently been stated that, as long as a disease exists anywhere in the world, it remains a constant threat to populations in more favorable position."

A review of the literature on various equine diseases and other investigations was made to determine their actual and potential threat to man's health. I shall discuss each disease separately.

Encephalomyelitis. This disease merits special consideration by the equine practitioner since the finger of suspicion has often been pointed at the horse when outbreaks of human encephalitis occur. However, investigators of Western and Eastern Equine Encephalomyelitis have pointed out that equines, like man, are terminal hosts in the infection chain. Data obtained over the past few years has added strong corroborative evidence to this point. The importance of the horse, both as a source of infection or as a sentinel animal, has been shown to be quite limited based upon the following factors: Horses carry low virus titers when infected; conversely, most species of mosquitoes require a much higher titer to become infected; there is a high proportion of immune animals in many areas; there is little evidence of concurrent infection in human populations in areas where the disease is a serious veterinary problem in horses; and, attempts at transmission by mosquitoes from clinical cases in horses to other horses were unsuccessful. Studies indicate that

the presence or absence of susceptible horses as a regulating factor of epidemics or epizootics is not as important as the presence of a sufficiently susceptible bird population. Concentrations of EEE or WEE viruses in the circulating blood of infected birds appear to be adequate for the infection of most mosquito vectors. These factors, for the present at least, should clear the horse as a reservoir of encephalitis for man. However, fluctuation in the geography of the different viruses, determination of new vectors and increases in the population of bird reservoirs and mosquito vectors are no doubt constant threats to modify the above factors. For example, there has been some speculation that exceptions in outbreaks of EEE may occur which would produce a viremia in horses high enough to infect man. It has been shown that the viremia of a horse infected with EEE is higher than one infected with WEE and occasionally, a highly viremic horse may be involved in spreading EEE.

Although absent from the North American continent, Venezuelan Equine Encephalitis (VEE) merits special attention by health officials. Studies have shown that the virus has the ability to spread among horses by simple contact. This is a departure from the generally-accepted mode of spread of the eastern and western types. In addition, infected horses have a high blood virus level which permits mosquito infection. The virus appears to multiply with greater efficiency in mammals and with less efficiency in wild birds than WEE and EEE. This situation reduces the fear of VEE for man since it is apparently dependent upon a mammal reservoir. According to Kissling, the disease would have difficulty in becoming permanently established in areas where the mammalian wildlife has been reduced to the low point now prevailing in the United States.

A small number of fatal VEE cases in man has occurred in South America, however, none have been reported in the United States. There have been a few cases in laboratory workers where the disease followed a mild form.

Japanese B, present in Japan, Korea, Malaya and a number of Pacific Islands, and Murray Valley Encephalitis of Australia have been listed by Hull as transmitted from animals to man but they are not considered as significant in the United States.⁴¹²

Leptospirosis. This is a typical disease which has been recognized for many years but only during the last fifteen to twenty years has been considered as a world-wide public health problem of increasing importance. A comparison has been made between leptospirosis and the systemic mycoses. Until the last few decades, coccidioidomycosis and histoplasmosis were considered rare; today it is known they are extremely common in certain areas.

The exclusive sources of this infection, direct or indirect, are the animal carriers that are shedders of the leptospires. One of the main factors brought out by Babudier in the transmission of leptospirosis to man is the importance of the animal that experience frequent manual attention. As we know, in this country, swine, dogs and cattle are the animals of major importance in its transmission to man, however, numerous types of leptospires which have caused disease in man, e. g., *L. pomona*, *L. grippotyphosa*, *L. seproe* and others, have been identified as the cause of outbreaks of the disease in horses. There appears to be a definite correlation between leptospirosis and periodic ophthalmia in the horse and it is of interest that man also develops certain ocular complications when ill of leptospirosis. In general, horses are not chronic carriers, however, leptospira have been observed for a period of three months after infection, indicating that the horse may be a link in the transmission of the disease.

Worthy of mention is that sera from horses in Turkey, taken by an Air Force Veterinary Officer, showed *L. grippotyphosa* to be quite common (Walter Reed Army Institute of Research, Walter Reed Army Medical Center). There has been considerable serologic evidence that this type causes the disease in man. In Yugoslavia an outbreak of *L. pomona* in some forty-two soldiers was attributed to horses watering in a stream above where men swam. In the United States cases were reported in individuals who swam in a stream that contained the body of a dead mule that had died of the disease. In Hungary it has been reported that a high percentage of horses have leptospirosis without showing clinical signs. The source usually is infected pigs and cattle. Another of naturally and experimentally infected horses produced the disease with eye complications, laminitis and dermatitis. Roberts of Cornell recently reported cases of leptospirosis in horses and pointed out the similarity of eye complications in horses and man from leptospirosis.

Thus, with this disease as others, we can see the horse may play an important role in the chain of transmission from animal to man or between animals. The global significance of this disease from a public health and livestock sanitary viewpoint is evidenced by the action of the World Health Organization and Food and Agriculture Organization in establishing six reference laboratories. The Division of Veterinary Medicine at the Walter Reed Army Institute of Research is the World Health Organization Leptospirosis Reference Laboratory for the Western Hemisphere.^{2, 3, 13-21}

Mycotic Infections. It has been established that the cutaneous mycoses, or ringworm infections of animals, are transmissible to man and constitute a public health hazard. However, there is some doubt that systemic or subcutaneous fungus infec-

tions are transmissible from one host to another. In the case of the latter it appears that infection occurs through inhalation of the fungus. The horse has been involved on rare occasions in the systemic and subcutaneous mycotic infection. It appears that inoculation into wounds or direct contact with open lesions is necessary.

Ringworm. The horse has been implicated in transmission of ringworm to man. Five different dermatophyte species have been found associated with ringworm infections of the horse. In order of frequency these are, *Trichophyton equinum*; (2) *Microsporum canis*; (3) *Trichophyton mentagrophytes* var granular; (4) *Trichophyton verrucosum* and (5) *Microsporum gypseum*. *T. equinum* appears to be consistently associated with ringworm of the horse. Rare infections have been reported in human contacts and in dogs. The other species occur less frequently in the horse but more often in man, particularly *M. canis*. Recent surveys made by the Communicable Disease Center, Public Health Service, showed an increase in the number of isolation for *M. canis*, and *M. gypseum* over previously reported cases in the United States.^{2, 3, 13, 25-58}

Sporotrichosis. A case of sporotrichosis occurred in a veterinarian who was operating on a mule suffering from the disease.²⁹ This disease has been mistaken for epizootic lymphangitis which on rare occasions has caused the disease in man. Human case have been reported in Kansas, and a survey in human revealed that 130 of the 148 recorded American cases (1926) appeared in the Mississippi River Basin.^{3, 30, 30}

Histoplasmosis. Histoplasmin reactors have been found in horses. A skin testing survey in the Ohio-Mississippi River area revealed that a large number of cattle, horses and sheep developed infection. Evidence at present, however, indicates that both man and animals acquire the infection from the soil.^{3, 28, 31, 34}

Cryptococcosis. Cryptococcosis has been found in horses. The organism has been isolated from nasal granulomas and myxomatous lesions of the lung. There have been no reports of transmission of the disease directly from animals to man but there is presumptive evidence that this may occur.^{3, 28, 34}

Actinomycosis. Actinomycosis, as we know, outstandingly affects cattle, followed by man, the horse, and swine in that order. In horses probably the most common infection is in conjunction with poll-evil and fistulous withers. The common practice of persons chewing straws and grain around these cases may expose them to infection.^{3, 32-34}

Rhinosporidiosis. Rhinosporidiosis occurs in the form of granulomas in the nose of man and horses and remains as a localized lesion.³

Epizootic Lymphangitis. Epizootic lymphangitis has rarely produced infection in humans. This has been borne out in enzootic areas where large numbers of infected animals have been handled. In one case a pathologist unsuccessful attempted to produce the disease by rubbing equine pus into the scarified skin.^{3, 34}

Aspergillosis. Aspergillosis may occur in horses as a pneumomycosis. Spores are widespread and, as in other mycotic infections, both animals and man probably acquire the infection through inhalation. Basically, prevention depends upon avoiding contact with moldy grain or bedding.^{3, 34}

Anthrax. A ten-year survey of anthrax in livestock, 1945-1954 (Stein and Van Ness) revealed 3,447 outbreaks in 39 states with a loss of 17,604 animals. The study points out that the disease is primarily one of cattle, and occurs chiefly during the summer months. Cases in horses usually occur where the disease first appears in cattle. Of the losses, horses and mules comprised approximately 12 per cent. Thirty-four cases of agricultural anthrax in man were reported in connection with outbreaks occurring in animals. The U. S. Public Health Service indicates 483 cases reported in man during the same period, most of which were of industrial origin. The number of cases of anthrax in human in the United States has steadily declined to the present level of 40 to 50 cases per year. Of interest to horsemen, cases (Hull) were reported resulting from animal feed; one girl in Louisiana developed a fatal case while carving statuettes from horse bones, and a man became infected while caring for a sick mule.

The Arkansas State Board of Health recently reported 3 cases of human anthrax. In contrast to the 3 previously reported cases which were in adult stockhandlers, these 3 were in children. The first, a seven-year-old white girl, had a typical cutaneous lesion on the posterior part of the left thigh. So far as could be ascertained, this lesion was the result of an insect bite or sting. The second case was in a white girl just under three years of age. A cutaneous anthrax lesion resulted from trauma to the right breast sustained from a fall upon a chunk of wood in a barn lot where 2 horses recently had died of anthrax. The third case was in a thirteen-year-old boy whose pony died of anthrax.^{2, 3, 13}

Vesicular Stomatitis. History records that in 1862, horses belonging to the Army of the Potomac suffered an outbreak of hoof-and-mouth disease that resembled vesicular stomatitis. In 1901 it was described as a malady of South African horses and in 1916 the French reported vesicular stomatitis in horses shipped from the United States and Canada. Geographically, it appears to be enzootic in the tropical and semitropical regions

of the Americans moving into temperate regions during warm weather, creating epizootics in the United States. In Southeastern United States vesicular stomatitis is known to exist enzootically in both domestic animals and certain wildlife. Virus isolations of the New Jersey type of this disease have been made from this area each year from 1952 to 1957 starting in May and June. The disease in man resembles influenza and has been contracted by him when handling infected horses and other animals or through laboratory infection. A recent report points out that the disease in man is more common than previously supposed and that 54 positive cases of vesicular stomatitis to date, have been diagnosed among laboratory workers, trainers and animal handlers at Beltsville, Maryland.^{3, 35}

Glanders and Melioidosis. Glanders has often been reported as the most important disease of horses to which man is susceptible. Although it has been eradicated in many parts of the world, it is still a problem in some areas of the eastern hemisphere. Cases in man in recent years (1950) have been reported in laboratory workers. The U. S. Department of Agriculture has reported no cases of clinical glanders in the last seven or eight years. Serum positive cases have been found with an increase in 1958. (See Table IX).

In the past, horses were believed to be relative refractory to frank infection with melioidosis. However, in recent years, naturally-occurring infections with melioidosis have been recognized. Three fatal cases in race horses were reported in Malaya in 1952. It is interesting to note that cultures sent in which were isolated from horses with a diagnosis of glanders were subsequently identified to be *Pseudomonas pseudomallei*, the etiologic agent of melioidosis (Division of Veterinary Medicine, Walter Reed Army Institute of Research, Walter Reed Army Medical Center). In the light of these recent findings it is highly probable that melioidosis occurred in horses in past years but was erroneously diagnosed as glanders. The two etiologic agents are remarkably similar bacteriologically. The agent of melioidosis, however, is motile, whereas, the glanders organism is non-motile. In this regard it is interesting that in 1909 (four years before discovery of the melioidosis etiologic agent) Bernstein and Carlung observed that the organisms from six human cases of glanders derived from contact with horses were motile.^{3, 22-24, 34}

Brucellosis. Horses are susceptible to all three strains of brucella but are more susceptible to *Brucella melitensis* and *Brucella abortus*. If they come in contact with infected goats they may acquire the melitensis infection. In the horse the most common symptoms are those associated with fistulous withers or poll evil. Agglutination tests conducted on various groups of horses have often shown some fifty per cent positive reactions.

It is assumed that infection occurs as the result of contact. We know that horses may infect man, particularly those with abscesses discharging brucella organisms. Two cases of brucellosis were reported in children with severe complications as a result of riding a horse with fistulous withers due to *Brucella abortus*.³

Rabies. Cases of rabies do occur in the horse. The U. S. Department of Agriculture over a ten-year period reported approximately four-tenths per cent of total cases diagnosed to be in horses as compared to 80% in dogs. Reschal has given the period of incubation of rabies in the horses at 21 to 90 days. The possibility of man contracting rabies from the horses appears unlikely but consideration of precautions in handling a case or disposition of a carcass is obvious.³

Salmonellosis. Outbreaks of salmonella food poisoning in the human from the consumption of horse meat have been reported. *Salmonella abortus equi* commonly infects the horse. Human cases from this source are probably rare, however, caution in handling of an infected foetus or animal is worth mentioning.³

Tuberculosis. Horses have a low to moderate susceptibility to the bovine type of Tubercle bacillus and are relatively resistant to the human and avian forms. Most cases reported have been of European origin and rarely are observed in the United States. In Germany the incidence of tuberculosis in horses over a given period was slightly over one-tenth per cent as compared to approximately nineteen per cent in cattle. A series of fifty-five cases in England showed all but two to be of bovine origin. Although a horse affected with the bovine type of tuberculosis with involvement of the lungs and kidneys could become a hazard to human health, the possibility of horses in the United States becoming infected is so unlikely that equine tuberculosis is of no public health significance. The possibility of transmission of the bovine type of infection in the horse to previously non-infected cattle maintained on the premises is worthy of consideration. In 1957 the Canadian Department of Agriculture reported a case of tuberculosis in a nine-year-old gelding. The Meat Inspection Division U. S. Department of Agriculture, did not report any positive cases in their activity reports of 1952-58.^{3, 22}

Pseudotuberculosis. Horses, as is true of most animal species, may be infected with *Pasteurella pseudotuberculosis* but the disease is one of the rarest in humans.³

Hemorrhagic Septicemia (Pasteurellosis). A human case of this disease from animal origin was first reported in 1930 from a cat bite. Normal horses, as well as the infected, carry the organism in the upper respiratory tract and sometimes in the

intestinal tract. The disease may occur as a complication of distemper or equine pleuro-pneumonia. Human infections normally develop from an animal bite but there are reports of other cases caused by animal contact. Of interest is a human case that developed as a result of a man being kicked in the foot by a horse.³

Relapsing Fevers Endemic. These fevers are present on all continents except Australia. The causative agent has been recovered from the horse. There does not appear to be much likelihood that the vectors known to be responsible for the disease would transmit it from the horse to man in the United States.³

Swine Erysipelas. This disease, being primarily one of swine and poultry, few other animals are susceptible to infection. The horse is supposed to be immune, however, dead horses have been incriminated by isolation of the organism from flesh and reports are on record of human infection among six veterinary students dissecting a horse.³

Sarcocystis. The involvement of horses muscle tissue with this parasite is not uncommon; however, the epidemiology of sarcocystis is not clear. Experimental evidence suggests that infection is acquired from food and drink contaminated with feces containing spores of the parasite.³

Trypanosomiasis African. The horse is considered to play a minor role as a reservoir of this disease in Africa.³

Schistosomiasis (japonica). Like Trypanosomiasis, the horse plays a minor role as a reservoir of this disease in the Orient.³

Mange (sarcoptes). The sarcoptic mange mite which feeds on horses will cause dermatitis in man.³

The foregoing review of equine diseases covers the principal ones which are considered to have potential public health significance. Others, no doubt, will be added as our knowledge of the interrelationship of animal and human diseases increase.

Through tissue culture, many recognized orphan viruses are being reported at a rapid rate but at this date we do not know what diseases they will produce. Dr. Kline of Temple University has said, "One can predict that a study of these newly isolated human and animal viruses will reveal many examples of identity or, at least of antigenic relationship."² Kaprowski, in a review of "Animal Counterparts of Human Viral Disease," makes it obvious that with the possible exception of the encephalitides, we have only scratched the surface in accurately matching animal diseases with those of man. His comment on new relations such as those between measles, distemper and Rinderpest, although speculative, could very well be a future reality. He stated,

"It is an intriguing thought that perhaps one day children will be vaccinated with distemper virus against measles, dogs with rinderpest virus against distemper, and cattle with measles virus against Rinderpest."²

As a source of further information to assist in establishing the prevalence of diseases of horses that may be transmissible to man, the U. S. Department of Agriculture Meat Inspection Division summary of activities was reviewed. Tables I, II and III reflect data pertaining to horses slaughtered and principle diseases and conditions observed on ante mortem and post mortem inspection.

TABLE I

ANTE MORTEM AND POST MORTEM INSPECTION OF HORSES BY MEAT INSPECTION BRANCH, USDA

| FISCAL YEAR | ANTE MORTEM | | | POST MORTEM | |
|----------------|--------------------|-----------|-----------|--------------------|-----------|
| | Total Inspected | Suspected | Condemned | Total Inspected | Condemned |
| 1952 | 350,932 | 39 | 9 | 350,918 | 1,735 |
| 1953 | 321,545 | 172 | 26 | 321,519 | 1,601 |
| 1954 | 250,295 | 77 | 13 | 250,282 | 1,037 |
| 1955 | 237,478 | 70 | 14 | 237,462 | 1,038 |
| 1956 | 179,537 | 69 | 6 | 179,531 | 865 |
| 1957 | 162,506 | 63 | 30 | 162,465 | 735 |
| 1958 | 125,845 | 69 | 10 | 125,875 | 612 |
| TOTAL: | 1,628,135 | 459 | 108 | 1,628,012 | 7,623 |

TABLE II

NUMBER OF HORSES CONDEMNED BY USDA FOR VARIOUS DISEASES AND CONDITIONS ON ANTE MORTEM INSPECTION FOR PERIOD 1952-1958

| | |
|---|-----------|
| Tetanus (Classified Infectious) | 8 |
| Emaciation | 2 |
| Abscess or Pyemia | 5 |
| Septicemia | 2 |
| Moribund | 28 |
| Pyrexia | 1 |
| Metritis | 1 |
| Pleurisy or Pneumonia | 2 |
| Immaturity | 2 |
| Pregnancy Advanced or Recent Parturition) | 1 |
| Uremia | 21 |
| Died in Pens | 25 |
| TOTAL: | 98 |
| INSPECTED: | 1,628-135 |

TABLE III

NUMBER OF HORSES CONDEMNED BY USDA FOR
PRINCIPLE DISEASES AND CONDITIONS FOUND ON
POST MORTEM INSPECTION FOR PERIOD 1952-1958

| | |
|---|-------|
| <i>Necrobacillosis and Necrosis (Classified Infectious)</i> | 1 |
| Anorexia | 12 |
| Emaciation | 1,532 |
| Hydropic Degeneration | 21 |
| Enteritis, Gastritis, Peritonitis | 297 |
| Metritis | 77 |
| Nephritis | 72 |
| Pericarditis | 17 |
| Pleurisy or Pneumonia | 2,362 |
| Carcinoma | 84 |
| Lymphoma or Leukemia | 16 |
| Melanosis (Non Malignant) | 1,522 |
| Abscess or Pyemia | 236 |
| Septicemia | 328 |
| Arthritis | 3 |
| Bone Conditions | 2 |
| Icterus | 18 |
| Uremia | 21 |

TOTAL CONDEMNED: 7,623 (All Not Included in List)

TOTAL INSPECTED: 1,628,012

In addition to controlling diseases of horses which may be transmitted to man, there are other means by which the equine practitioner may contribute to the health and safety of his clients or community. These can be placed under the broad terms of preventive medicine and health education. As mentioned before, the utilization of ultrasonic apparatus, x-ray and, various chemicals and drugs can be a serious hazard in the hands of the unskilled and uninformed.

The introduction of foreign animal diseases is a constant threat to our animal populations. With this thought in mind it appeared that the knowledge of the number of horses, burros and mules imported into the United States would give an index to the potential problem. Tables IV, V, VI reflect the number of animals, by country of origin imported into and exported from the United States. It is of interest to note the increase in importations from South America.

The following data concerning the U. S. Department of Agriculture requirements on importation and exportation of horses was obtained during the course of preparing this paper. Although subject to change, it is thought that this might be of assistance to certain individuals.

The U. S. Department of Agriculture's regulations governing the inspection and handling of livestock for export are contained in the reprint, 9CFR, Part 91, as amended, entitled, "Regulations Governing the Inspection and Handling of Livestock for Exportation." Sections 91.4, 91.5, and 91.6 are particularly applicable to horses with respect to health requirements.

The Department's import regulations applicable to horses are contained in 9 CFR, Part 92, entitled, "Importation of Certain Animals and Poultry and Certain Animal and Poultry Products," which has been amended a number of times. With respect to horses from countries other than Canada, Mexico,

TABLE IV
**HORSES, MULES AND BURROS EXPORTED FROM AND
IMPORTED INTO THE UNITED STATES**

| | FISCAL YEAR 1958 | Horses IMPORT | Mules FISCAL YEAR 1956 | BURROS |
|------------------|------------------|------------------|---------------------------|--------------|
| Mexico | 15,533 | 3,206 | 56 | 1,982 |
| Rejected: | 391 | 177 | | 283 |
| Canada | 13,924 | 25,374 | 19 | 23 |
| Rejected: | 71 | 84 | | |
| Other Countries | | | | |
| By Air: | 940 | 586 | | |
| By Ocean Vessel: | 542 | 2,091 | | |
| TOTAL: | 31,401 | 31,518 | 75 | 2,288 |
| EXPORT | FISCAL YEAR 1956 | Horses | FISCAL YEAR 1958 | BURROS |
| | 31,401 | | Mules | |
| Mexico | 2,762 | | 33,881 | |
| Canada | 418 | 494 | Not Recorded* | |
| Canada | 418 | 494 | | |
| Other Countries | | | | |
| By Air: | 403 | 336 | 2 | 9 |
| By Ocean Vessel: | 1,403 | 408 | 132 | |
| TOTAL: | 4,986 | 1,238 | 134 | 9 |
| | | | 1,381* | |

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TABLE V

THOROUGHBRED HORSES IMPORTED INTO THE UNITED STATES AND THEIR COUNTRY OF ORIGIN

| COUNTRY | 1954 | 1955 | 1956 | 1957 | 1958 | (Up to 22 Sept. '58) |
|-----------------|------|------|------|------|------|----------------------|
| England* | 343 | 307 | 377 | 265 | 260 | |
| France | 65 | 38 | 76 | 70 | 36 | |
| Australia | 6 | 2 | 12 | 12 | 20 | |
| Chile | 9 | 4 | 15 | 5 | 12 | |
| New Zealand | 1 | | 4 | 4 | 1 | |
| Argentina | 23 | 10 | 63 | 91 | 79 | |
| Germany | 1 | 2 | 1 | 1 | | |
| Hungary | | 9 | | | | |
| Jamaica, B.W.I. | | | 2 | | | |
| Italy | | | 2 | 7 | 3 | |
| Uruguay | | | 1 | | | |
| Sweden | | | 1 | 2 | | |
| Brazil | | | | 1 | | |
| Japan | | | | | 1 | |
| Colombia | | | | | 2 | |
| TOTAL: | 446 | 372 | 554 | 458 | 414 | |

*Includes England and Ireland.

THE JOCKEY CLUB

TABLE VI

THOROUGHBRED HORSES EXPORTED FROM THE UNITED STATES TO FOREIGN COUNTRIES

| COUNTRY | 1954 | 1955 | 1956 | 1957 | 1958 | (Up to 22 Sept. '58) |
|--------------------|------|------|------|------|------|----------------------|
| England | 23 | 27 | 19 | 12 | 19 | |
| Ireland | 15 | 17 | 5 | 11 | 6 | |
| France | 10 | 15 | 14 | 11 | 8 | |
| Venezuela | 13 | 11 | 24 | 11 | 3 | |
| Japan | | 4 | 2 | 1 | | |
| Colombia | | 3 | | | | |
| Germany | | | 1 | | 1 | |
| Chile | | | | 4 | | |
| Sweden | | | 1 | | | |
| Brazil | | | | | 1 | |
| Italy | | | | | 1 | |
| Dominican Republic | | | | | 3 | |
| TOTAL: | 61 | 81 | 73 | 52 | 36 | |

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Central America, and the West Indies, attention is invited especially to Sections 92.-(e), (i), and (o); 92.3(b), (c) and (d); 92.9; and 92.17 of the basic regulation; and Sections 92.2;

92.3(a); and 92.8 of Amendment 4. Regulations applicable to the importation of horses from Canada, Mexico, Central America, and the West Indies are covered in various portions of the remaining regulations. With respect to Canada, horses are permitted entry at the present time if upon veterinary inspection at the port of entry they show no evidence of communicable disease. With respect to horses from Mexico it is necessary that the importer or his agent make arrangements with the U. S. Department of Agriculture port veterinarian concerning import veterinary inspection, precautionary dipping, tests, etc. Paragraph (b) and (c) of Section 92.39 of Amendment 5 contain information about inspection for ticks, testing, dipping and detention at the port of entry. The area of Mexico adjacent to the United States from the Gulf of Mexico west to the point where San Francisco Creek (Brewster County, Texas) meets the Rio Grande is considered a fever tick infested area as is the area in Mexico comprising about the western third of Baja, California.

With respect to tests mentioned in paragraph 92.39(c), blood samples are collected from the horses at the port of entry at the expense of the importer and under the supervision of the U. S. Department of Agriculture veterinarian at that port. The prepared serum from these samples is forwarded to Washington, D. C., where the complement-fixation tests for dourine and glanders are made.

Because of the existence of fever ticks in Central America and the West Indies, the regulations applicable to horses from that area are substantially the same as for horses from Mexico. As of possible interest, U. S. Department of Agriculture AIQ Branch Memorandum No. 630.6, dated February 17, 1955, concerns the importation of horses from Mexico and a leaflet has been published on Disposition of Equines from Mexico Tested for Dourine and Glanders.

Additional information on the number of equines imported and certified by the U. S. Department of Agriculture for breeding purposes is contained in Tables VII and VIII. The certification procedure is a voluntary one and permits citizens to import the animal duty free if certified.

Table IX reflects the results of serum samples from imported horses, burros and mules tested for dourine and glanders.

SUMMARY AND CONCLUSIONS

An attempt has been made to review the diseases of horses which are reported to be transmissible to man and where possible, cite specific cases. In addition, new relationships were briefly explored and the potential of introducing equine dis-

eases into the United States investigated. Actual and potential contributions of the equine practitioner to public health were pointed out and peculiarities of his practice discussed. It was concluded that there are diseases which the horse can transmit to man. In some instances the horse has been falsely accused. Proportionately, the horse plays a small role in man's health when compared with other groups of animal reservoirs of disease. Nevertheless there is an ever-present and increasing potential of this role. The veterinary aspects of public health and the profession's capability to contribute has been established. Therefore, the equine practitioner, being the authority on diseases of the horse, must be prepared to assume the responsibility of accurately counseling his clients and informing authorities on the health implications of the diseases he treats. He should be aware of the actual conditions encountered in his practice which affect man's health and alert to the detection of new threats and relationships.

TABLE VII
IMPORTED HORSES BY BREEDS AND COUNTRY
CERTIFIED — FISCAL YEAR 1957

| BREED | COUNTRY | | | | | | | | | | | |
|-----------------------|-----------|-----------|----------|-----------|----------|---------------|-----------|----------|----------|-------------|----------|----------|
| | Australia | Argentina | Brazil | Canada | Chile | Great Britain | France | Italy | Jamaica | New Zealand | Norway | Scotland |
| American Saddle Horse | | | 2 | | 1 | | | | | | | |
| Arabian | | | | | | | | | | | | |
| Balgain Draft | | | | 11 | | | | | | | | |
| Clydesdale | | | | 11 | | | | | | | | |
| Fjordhest | | | | | | | | | | 6 | | |
| Hackney | | | | 2 | | | | | | | | |
| Shetland Pany | | | | 9 | | | | | | | 2 | |
| Standardbred | | | | 20 | | | | | | | | |
| Thoroughbred | 43 | 12 | 1 | 2 | 6 | 263 | 53 | 6 | 2 | 3 | | |
| Welsh Pony | | | | 1 | | 50 | | | | | | |
| TOTAL: | 43 | 12 | 1 | 58 | 6 | 314 | 53 | 6 | 2 | 3 | 6 | 2 |

TOTAL NUMBER CERTIFIED DURING FISCAL YEAR 1957: 506

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TABLE VIII
IMPORTED HORSES BY BREEDS AND COUNTRY
CERTIFIED — FISCAL YEAR 1958

| BREED | COUNTRY | | | | | | | |
|---|-----------|-----------|--------|-------|--------|---------------|-------|------|
| | Argentina | Australia | Canada | Chile | France | U. S. Britain | Italy | Peru |
| Arabian | | | | | | 34 | | |
| Belgian Draft | | 8 | | | | | | |
| Clydesdale | | 7 | | | | | | |
| Hackney | | | | | | 4 | | |
| Percheron | | 2 | | | | | | |
| Shetland Pony | | 27 | | | | 3 | | |
| Standardbred | | 3 | | | | | | |
| Thoroughbred | 36 | 10 | 11 | 5 | 72 | 304 | 3 | 1 |
| Welsh Pony | | | 14 | | | 176 | | |
| TOTAL: | 36 | 10 | 72 | 5 | 72 | 522 | 3 | 3 |
| TOTAL NUMBER CERTIFIED DURING FISCAL YEAR 1958: 721 | | | | | | | | |

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TABLE IX
RESULTS OF SERUM SAMPLES TESTED FOR DOURINE
AND GLANDERS IN HORSES, BURROS AND MULES

| DISEASE | FISCAL YEAR 1956 | | FISCAL YEAR 1958 | |
|-----------|------------------|--------------|--------------------|-----|
| | Border Ports | Border Ports | Ocean and Airports | |
| Glanders | 10,743 | | 6,690 | 325 |
| Positive | 5 | | 19 | 1* |
| Suspected | 19 | | 8 | |
| Dourine | 10,521 | | 6,690 | 0 |
| Positive | 4 | | 94 | |
| Suspected | 12 | | 9 | |

* Arabian stallion from Hungary.

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PROBLEMS INVOLVING INFECTED MARES AND THEIR TREATMENT

W. R. McGEE, D.V.M.

Sterility is a mighty harsh word where I come from and one that can be dangerous on occasions. I read reports on sterility problems in cattle, sheep and swine and sometimes I can't help but envy the fellow dealing these animals. If worse comes to worse such problems can be resolved by eating them—now in the broodmare business—I can truthfully say I've had a few that I would gladly have eaten to get rid of them. I said the word sterility could even be dangerous. If you don't believe it try telling an owner his old beat up mare, barren for the last six or seven years, is sterile or won't have another foal and he should get rid of her. He takes your advice and gives her away only to have her show up the next spring with a big good looking colt for somebody else—do it every time. As far as I am concerned any mare can conceive and have a live foal. The chances may be ever so slight but there is always the possibility. I try to kid myself a little by taking the attitude I'm working on fertility problems rather than sterility—sounds to me like I have a little better chance of success. Theoretically the bulk of this work is supposed to be done prior to the beginning of breeding season, preferably in the fall before it goes down to 10° above for the winter. Somehow it never has worked out that way for me and actually occupies all of the most miserable weather of the winter and spring including breeding seasons.

My routine approach to the handling of these so-called fertility problems is based on three general moves.

- (1) Evaluation of present breeding status.
- (2) Treatment, if any.
- (3) Management

Some sort of record system is essential and the more simple the system the better since it is more likely to be kept up to date.

In evaluating the mare as a breeding prospect age, condition and history will serve to get started. Naturally we would like to have breeding stock in a good thrifty condition (not fat) regardless of age. However, because of advanced age and various infirmities resulting therefrom some mares will need special care, vitamins and feeding. A check of the teeth, the parasite population and a CBC is worthwhile procedure in any mare in poor condition. If an owner thinks enough of an old mare crippled with rheumatism, chronic arthritis or laminitis

or similar conditions to want to keep her for breeding purposes "one more year" perhaps some "bracing" with butazolidin, cortico-steroid therapy or neurectomy should be considered.

History when available and dependable is very helpful. Routine questions are:

- (1) "How many years barren?"
- (2) "Any slips (abortions) and if so were they early or late?"
- (3) "What horse was she bred to, how many times?"
- (4) "Did she have regular heat periods?"
- (5) "Was the last foal normal—any trouble in delivery?"
(prolapsed uterus).
- (6) "Has she ever shown any discharge or been treated for uterine infections?" The answers to these questions serve to eliminate some causes and suggest two or three more than can be checked further.

Habitual abortion is not uncommon on broodmares and I have known it to occur in the same mare twice or more during the same breeding season. Where the abortion is early (50-60 days), appropriate hormone therapy often is effective in stopping it. An owner will often say he thought the mare was in foal since she missed several periods and acted in foal but then came in a normal heat, or, that the mare had been examined and pronounced in foal only to show in two or three weeks later. Repetition of this story suggests the distinct possibility of habitual abortion especially in the absence of another cause.

When a mare is being bred to a known shy breeding stallion we naturally cannot be too disappointed in not being able to find something wrong with her that would prevent conception. If she was bred only one or two times to any stallion she still need not be other than normal if other causes are not apparent. A regular and well defined estrus cycle indicates that the ovaries are functioning normally and that ovulation is, in all probability, taking place on schedule. Absence of heat periods or poorly defined ones would suggest ovarian dysfunction or so-called "silent heat". Subsequent and possibly routine examinations would be necessary to determine which, if either, was responsible for this action. A history of dystocia or embryotomy often will explain and give some idea of the extent of injuries to the birth canal. Complications such as prolapsed uterus markedly affect the future productive expectancy of a mare. Damage as the result of this is probably undetectable on gross physical examination and information gained from a reliable history will lend an appreciable degree of accuracy to a prognosis.

History of past infections and treatment, if any, help in determining procedure for further culturing and possible choice of therapy.

While the above determinations take less time than it has for me to tell about it, and as is true of most histories, must often be discounted to some degree, they are important because very often the most thorough physical and bacteriological examination of the genital tract fails to reveal any abnormality whatsoever. It then is up to the veterinarian after proper rumination of this data to come up with some reasonable estimation of the chances the mare has of future production.

Manual examination of the reproductive tract can hardly be classified as an exact science and the results actually amount to opinions or impressions of the examiner. It is understandable then that this can lead to a degree of variation in the interpretation of findings. I expect confidence, experience and imagination contribute mostly to this interpretation. As in most undertakings experience serves to harness the imagination as well as inspire some degree of confidence and conservatism. To review briefly the routine of the manual examination which is familiar to all of you, I'm sure, it is convenient to begin by a thorough palpation, per rectum, of the cervix, uterus, ovaries and, insofar as possible, the Fallopian tubes. The anestrus cervix is a firm cylindrical structure that relaxes to a relatively shapeless mass during estrus.

We expect to find the uterus suspended in the broad ligament about the level of the pelvic floor. In young mares slightly higher—in old mares lower. In anestrus the body and horns have a more or less symmetrical tubular shape and a firm elastic feel. The symmetry and elasticity are greatly decreased during estrus. Flabby, atonic and thick walled uteri and indurated cervix in the anestrus mare should be looked on with suspicion. In the presence of infections they are difficult to clean up.

The Fallopian tube may be picked up at the end of the horn and followed out to the ovary. Relatively small and thick walled normally, it may occasionally be found adhered to surrounding structures. A small enlargement indicating possible occlusion is found in a small percentage of cases.

I think most of us will agree that the ovaries of the mare show about the most inconsistency and least uniformity of any of the components of this beast. They vary considerably in size, shape and consistency at any given examination and are continually changing so that a perfectly normal ovary must have many normal sizes and shapes. I'm sure some such normal functioning ovaries are, on occasions, classified as abnormal or cystic. Personally, I attempt to judge ovaries on perform-

ance rather than conformation. It is amazing what excellent performance we often see from out-sized, ill-shaped ovaries. Where function as evidenced by regular heat periods appears normal I can overlook minor irregularities. Greatly enlarged cystic or tumorous ovaries, sometimes with extensive adhesions are occasionally found.

Next the vulva is examined for any evidence of discharge. The position of the vulva in relation to the vertical plane along with tone and deforming scars is noted. After thoroughly washing the genitals the vaginal speculum is inserted and a visual examination of the vagina and cervix is made. Here again we look for inflammatory exudates, scars and adhesions, especially in and around the cervix. If the mare is in heat and the cervix relaxed cultures are made if indicated. Where the history is questionable and the mare is not on my records I often test the patency of the cervix by inserting a gloved finger. Adhesions are sometimes present that cannot be seen.

Culturing technics vary somewhat in that some of us use solid media, others broth tubes. Sterile swabs or the familiar culture loops are commonly used for inoculating the media. I have used various devices designed to get a culture from within the uterus without contamination from cervix or vagina—none wholly satisfactory. Uniform results can be expected with a little care.

TREATMENT: (Surgical)

Minor surgical repair will be required to correct deformities of the vulva from old foaling injuries in a few instances. An occasional cyst or polyp will appear to be interfering with the function of the cervix and probably should be removed.

A good many mares will have had the vulva sutured. Perhaps it has partially torn out or needs to be brought lower. Any holes in the suture line should be eliminated. It will be decided to suture some for the first time.

The suturing or, if you please, the Caslick operation is basically a very simple procedure, however, there is some variation in methods and materials.

The standard procedure is to wash the external genitals thoroughly and under proper restraint the lips of the vulva are infiltrated with 2% procaine or a suitable substitute along the junction of the skin and mucous membrane from the upper commissure downward to the level of the pelvic floor. A strip of mucous membrane $\frac{1}{2}$ inch wide is removed along this same line with forceps and scissors after which the raw surfaces are brought together with a row of interrupted dermal sutures. An occasional individual because of thin, toneless vulvar lips and slanting position of the vulva will continue to

aspirate air into the vagina if this procedure alone is used. Under such conditions it is necessary to strip a line on either side, 2 inches inside the vulva and bring these surfaces together. The outer borders are then sutured as described. I know some of you fellows prefer a deeper or thicker suture line but with a few exceptions I use pretty much the routine outlined. I have removed stitches of various material including sack twine, fishing line, shoestrings, and hog-rings. I suppose the results would have to be classified as almost satisfactory although evidence indicated that whatever local anesthetic was used left a lot to be desired.

For my vote there is one suture material stands out for this job and that is vetafil. I used nothing but silk-worm gut for years until Vetafil came along. It does the same job more handily. There is no tissue reaction, it is strong, handles and ties easily and securely. If necessary it may be left in during breeding without fear of injury to the stallion.

Mention has been made of the cervical culture to determine the presence and nature of genital infections. This is more or less of a routine procedure in the care of large bands of broodmares. Unquestionably genital infections in some degree are responsible for a significant percentage of failures on conception and/or abortion. Also many foals are seen with clinical or sub clinical disease conditions attributable to intra-uterine infection. However, this is a particular area of my practice where I feel there is quite a bit of lost motion.

A hasty calculation based on the last 200 cultures showing growth on our records indicated that:

55.4% strep
21.2% coli
18.3% staph
3.8% pseudomonas
1.3% fungi

These percentages seem to be about the same over the years.

With the coming of antibiotics treatment became more complex and now with the development of resistant strains further complications confront us. Sensitivity tests designed to remove some guess work are available and according to the advertised efficiency of modern antibiotic preparations we really shouldn't experience any trouble in cleaning up any of these infections. Such is not quite the case—at least in my experience.

A few points that cause me to wonder if we don't tend to overshoot on the matter of treatment are:

1. Our colleagues in the human gynecological field insist that the vagina and cervix commonly show bacterial

growth on culture. As a matter of fact, one man went so far as to say he has never cultured a sterile cervix.

2. Even eroded and acutely irritated cervixes in women do not necessarily preclude conception.
3. I think we will have to admit that a good many mares showing positive cervical cultures as well as some showing gross signs of genital infection do conceive and do produce live healthy foals. This became so apparent that some prominent equine practitioners in England and Ireland have all but stopped using culturing procedures. Instead they depend on visual examinations of the cervix. Treatment for infection and breeding may be done the same day. Records indicate they enjoy the same degree of success that we do.
4. It is a fact that infection may be present in the genital tract and still a negative culture will be obtained. One or two heat periods pass with clean cultures then a growth is found on a subsequent one.
5. Sensitivity tests may be misleading in that indicated antibiotics do not always act as well in the uterus as they do on the media, possibly due to pH, etc.

I suppose I have tried about everything anyone has offered in the way of treatment for genital tract infections in mares. Conclusions drawn from this experience have led me toward a rather simplified method of handling these mares. It seems to me that it isn't so much what you use as how you use it. The problem is more mechanical than medical in that whatever agent used must come in contact with the infected tissue. In order to accomplish this is necessary to remove all possible debris, then with the help of an agent to reduce surface tension the drug of choice is applied to the infected surfaces. This procedure repeated often enough for sufficient time can ordinarily be depended on to give satisfactory results.

Also of the dozens of preparations to choose from, one of three or four will do as well or better than any of the others.

Furacin, nolvasan, sulfamethazine cover about all infections commonly encountered. Where pus, etc, is present the uterus is douched with warm Zonite or saline solution and drained as well as possible. The preparation is selected and placed through the cervix. This is repeated daily or every other day as indicated by amount of discharge.

I try to distinguish cervicitis and not treat the uterus unless necessary. Atomizer or insufflators may be used to treat simple cervicitis or vaginitis.

In conclusion I must admit that on occasion where a cervical culture shows a few colonies of bacteria but the vagina

and cervix appear in the picture of health I am not above breeding such a mare. In such instances I like Pfizer's Embryostat before breeding and the day following.

CHAIRMAN KESTER: Any questions?

DR. O. R. ADAMS [Fort Collins, Colo.]: We have had three mares that on Embryostat showed considerable increase of inflammation on subsequent days, and it would not recede until we changed to some other antibiotic. I wondered if you had any experience with that.

DR. McGEE: I have not had with that particular thing, although with almost anything you use in the uterus, you will sooner or later come across an individual that will show whether it is sensitive to it or not. It will become overly irritated by it. For a while it seemed to be somewhat of a secret as to what Embryostat was. It should not be too much like that.

With almost anything you use, occasionally you will find a mare that flares up and becomes quite irritated. It does a lot of straining for a few days but generally recovers pretty well. I do not repeat the same treatment.

DR. A. W. SKEWS [Union Grove, Wis.]: What is your treatment for anestrus?

DR. McGEE: I am like the rest of you, I use everything I know how, on occasion. I did conduct sort of an amateur survey for a couple of years, when I had a real eager boy riding with me, and a pretty good bookkeeper. He did keep track of the things that we had used to try to promote heat in these mares. I think we were using saline, stilbestrol. That was shortly before E.C.P. became available. I think we used the pregnant mares' gonadogen. As I recall, the saline was effective in a little over 60 per cent of the cases. Stilbestrol gave satisfactory results in something over 40 per cent, and the other two were impractical preventing depending on routinely.

I know that saline is a little bit unfavorable, in that often-times, regardless of how clean or how hard you try, you wind up with an infected mare. I will say in most of those cases it is a temporary and almost self-limiting thing, in that probably the next period, when she rolls around again, she will have cleaned up herself. In using saline, the warm saline, I always incorporate a little crystalline penicillin, or something like that, in trying to get away from it, but still you will get an occasional infected mare. Why it is, I do not know. Different groups will have entirely different results with the same thing. I have seen stilbestrol work just like a miracle, like shooting fish in a barrel, and producing satisfactory estrus, breeding and conceiving. Some other people just cannot get it to work at all.

DR. CHASSELS: How did your hormone implant work out, and what success did you have?

DR. McGEE: I meant to mention that in the body of this thing. Perhaps some of you know of it. I picked it up in England, I think. In these old, chronically infected mares, they implanted a tablet of stilbestrol subcutaneously and left it for anywhere from two to four months, which resulted in the mare being in estrus practically all that time, at least they had the congestion and the secretions accumulate in the uterus, cervix and vagina.

I gave it a good try. I think I expected too much of it in some of the cases I tried it on. It certainly is not any cure-all for those old infected mares. I did feel I did enough good with it to keep it in mind, and I do use it occasionally.

DR. HOWARD: How are you handling them in the estrous periods in the spring?

DR. McGEE: That is a pretty rough question. Most of the breeders handle them themselves. Where it is up to me to make a decision on them, it is just a question of examining them, either with a speculum, or rectal examination, for follicles. If you find that you have a chance, breed them, regardless of what they show. They will show, of course, whether they are in estrus or not, a lot of them, for those long periods. I think you can get into trouble in the way of infecting young mares. If you start breeding early, you will wind up breeding most of them in July.

DR. HOWARD: How long have you had one, or definitely got safety?

DR. McGEE: You mean in a true heat, or do you refer to showing to the teaser?

DR. HOWARD: True heat.

DR. McGEE: I have seen them for almost fantastic periods. You will follow a mare along for two weeks, thinking you will get to breed her almost any day. Finally, maybe the cervix will be opened enough but the follicle seems undeveloped. You go along maybe two weeks or more before you decide to breed her, if you can get ovulation, and get conception.

DR. A. W. PATTERSON, JR. [Hanover, Pa.]: I can help you out a little bit on that. Our records show that last year we had nine mares that were in season for anywhere from twenty-one to thirty-two days. Of that group, four got in foal on the twenty-fourth or twenty-fifth day.

DR. W. P. HUMPHREY [Oxnard, Calif.]: On the habitual aborters you spoke of, how long do you carry them on progesterone, after you have started?

DR. McGEE: I have a list of mares that I carried right on through. On those that I feel quite confident, I use it, as I think they recommend, every three weeks. It takes about that long to pick up that progesterone. Every three weeks or a month I give them their progesterone. It does not seem to affect the length of gestation, or anything like that. They go right on through. They foal normally and come right back for more.

DR. HUMPHREY: Do you carry the progesterone right on through?

DR. McGEE: Theoretically, the point of this thing is that there is a shift of hormone production along about sixty days there, and presumably it is at that time you get a low level progesterone, and get your abortion. But I am not quite confident enough of that. I keep giving such a mare a little progesterone right along.

DR. HUMPHREY: The reason I raise that question, Roberts at Cornell has done some work on that. He has come up with the statement that a mare, after six months' pregnancy, does not need progesterone.

DR. McGEE: He is probably more correct than I am. I am just afraid to back off of it, since it has done pretty well.

QUESTION: How do you use Nolvasan for intra-uterine injection?

DR. McGEE: If you have a good estrus and can get through the cervix, I use the regular uterine catheter. There is another thing. I think you will probably run into more cases of sensitivity than with any of the antibiotics. Every once in a while you run across a mare where it seems as though she catches fire from the Nolvasan. I have not seen permanent damage from it but perhaps it would be just as well to put that stuff into solution before you put it in there. I have seen cases where I felt that the actual mechanical irritation of shoving those dry boluses through a rather tight cervix was responsible for more trouble than the actual action of the drug.

DR. J. H. CLEMENTS [Grinnell, Iowa]: We have a lot of mares continually in estrus on the track. Do you have a good approach to that continuous estrus?

DR. McGEE: No, I do not work on the track. I am sorry I cannot help you a bit. Do not give them a lot of hormones. I could help you a little bit, if you can help me get some of the maiden mares in, after I get them back to the farm, if you fellows will handle them a while.

DR. BEEMAN: What volume of saline do you use?

DR. McGEE: About 500 c.c. Be sure it is a little warm, especially in cold weather. It makes them a little crampy, if you don't.

DR. CHASSELS: Do you agree with Colonel Sager that a lot of these mares abort at ninety days?

DR. McGEE: I can hardly prove that he is wrong, Jack. I think he is a little more inclined toward absorption than I would be. I have not been able to verify that. I am sure a lot of mares abort between, say, fifty and ninety days.

DR. CHASSELS: Do you feel that is a weak period in conception?

DR. McGEE: I think, perhaps, between fifty to seventy days is about the weakest period. We had some discussion with the insurance company on this live foal proposition, trying to determine a time to examine a mare, to be sure, at least to have a little better shake.

DR. RAIMONDE: Do you use a loop to obtain the culture, and what is your media?

DR. McGEE: I use both, depending upon the conditions. I think you are apt to pick up a little more contamination on a swab. If I have a relatively quiet place and not much apparent contamination, I think a swab is quicker and handier, but otherwise I use a loop. I think you get a little better spread. If you do not have enough secretion, when you put a dry cotton swab through the cervix, and come out with a streak or slant, I do not feel you get a good bit of material to grow from. With the loop, you can see about what you have got, and you can see it after you spread it on a slant. As far as the media, I think the standard is a heart infusion product. I could not give you the exact composition of it.

DR. MCKIBBEN: How did you give the stilbestrol, intra-uterine?

DR. McGEE: No, intramuscularly. [Applause]

SURGICAL TREATMENT OF TENDINITIS

— A PANEL DISCUSSION —

Moderator: E. A. Churchill, V.M.D., Panelists: D. L. Proctor, D.V.M., George M. Palmer, V.M.D., James T. O'Connor, V.M.D.

MODERATOR CHURCHILL: As many of you will recall, last year at this meeting Dr. Proctor presented a paper on "Surgical Treatment of Tendinitis" and he had some sort of an excuse about the slides, that they got lost or something. So, we cannot let him get away with that.

At this time I think we will ask Dr. Proctor, through the aid of his slides, to briefly review his technique and the results of this technique, in so far as he has been able to determine to this point. Then we will go on with the other panelists who I understand use a variation of that technique, and see if we can come to some conclusion about the ultimate results of this surgical procedure. Dr. Proctor!

DR. D. L. PROCTOR: I did manage to get the slides here this trip. Those of you who saw them at the Philadelphia meeting, I give my apologies because, as far as I know, they have not changed.

[Slide] I think one of the primary considerations in the surgical approach to tendinitis is absolute asepsis. This leg has been shaved, and it has had a 1:500 mercuric chloride pack on it for twenty-four hours. It has been draped, in this picture. The shaved area has been disinfected, or an antiseptic pack of aqueous Zephran has been applied. Here we have the foot draped and the bottom table draped into position.

[Slide] As you see, I am not a bit bashful about the length of my incision. One of the things that has been indelibly impressed on me is that these incisions heal from side to side and not from end to end. I am a firm believer that traumatized tissue, by working through too small an incision, is a bigger threat to good healing than any other single factor.

[Slide] In this particular slide, the skin has been reflected. The underlying fascia is being dissected. I use this second layer of tissue to take the place of the mesotendon which is so incorporated in the fibrous tissue that makes up the true bow, that it is no longer distinguishable. The fascia is reflected. You can see the annular ligament, the volar annular of the fetlock in this dissection.

[Slide] We have gone a shade deeper. If you notice the forceps I have in my hand. I have cut the annular ligament, the volar annular ligament. I have the edge of that ligament grasped by those forceps.

[Slide] This is the same dissection proceeding a little bit further, in which each of us has an edge of the annular ligament.

[Slide] Essentially the same picture, except in this case we have gone a step further and have bared the ring of the superficial digital flexor. If you notice this pair of forceps extending down through the ring. Here is the tip of the forceps. In addition to cutting the annular ligament, the next step will be to follow the forceps and cut the edge of the ring of the superficial digital flexor.

[Slide] I have proceeded with the dissection a little bit further now, and the fibrous tissue, the abnormal fibrous tissue that is covering the tendon itself is being picked up with this one pair of forceps. My finger is inserted between the deep and superficial tendon in such a way that you can move it freely the entire length of the tendon. All abnormal fibrosis is dissected. I feel that the overall picture, the prognosis, is almost in direct proportion to the ease with which the line of cleavage between the fibrosis and the superficial tendon is found and the dissection carried out. If you can do it with the back of your scalpel blade in blunt dissection, the prognosis is much better.

[Slide] Here is a piece of the dissected fibrosis, fibrotic tissue, that has been removed from the superficial flexor, and I have got it picked up in these forceps.

[Slide] This is a little disconcerting. That is over an inch in breadth here, and this is probably an inch and one-half to two inches. This, of course, is that part of the volar annular ligament that reaches from the posterior edge of the sesamoid all the way around to the median raphe and back to where it begins to attach to the sesamoid on the distal side. In other words, we take the whole back of the volar annular ligament. This will vary. I have one specimen at the office where we actually removed seven ounces of fibrous tissue that had encompassed and caused adherence of the superficial and deep digital flexors.

[Slide] We do a two-layer closure, one a fascia and the other of the skin. Both are whipstitch, interrupted sutures. I try to be exceedingly careful and use a single 0 swaged-on needle, cutting edge. We try to approximate the edge of the skin carefully so we get good coaptation, not pressure. Usually it is not a problem because you have taken out enough fibrous tissue so, actually, you have more skin than you need. On oc-

casion, I have cut out as much as half an inch of the skin because I had that much more, having reflected the seven ounces of fibrous tissue.

[Slide] I find these tension buttons are the answer. You get a great deal of cellulitis, after this extensive piece of dissection, and these tension buttons have worked out very well in maintaining the very fine suture that we use, getting away from tension.

[Slide] This operation, as we have worked the thing out, has evolved into local anesthesia, plus sedation. We put the animal on the table and, when we are through, we just sit him on his feet, and he walks off. We do not have a postoperative recovery period. Many times you do a decent job and then have him foul it up, in the excitement period of post-anesthesia.

As a routine procedure, we have evolved this procedure of local anesthesia plus sedation. Actually the animal is done under local anesthesia on the table, and the majority of them tolerate it very well. What little acrobatic surgery is necessitated by this procedure I feel is apropos, because all except one or two animals have gotten on their feet and walked off that table without any difficulty at all.

Now, I have about a five-minute movie that shows essentially the same things we discussed here, but you may see some part of the technique in the movie that you have not picked up by watching these slides.

[Motion picture] This is amateur photography.

I gave the animal Relaxan. About 30 cc. usually does it. This is the ulnar block; you just witnessed the median.

Then I come down and pick up the branch of the volar in a couple of places there, on the outside of the metacarpus. This is reflection of the skin.

Now I am reflecting the layer of fascia. At this point we are actually picking up the area of fibrosis that is connected, and it is over and under and around the mesotendon.

Now we are putting the forceps down through the ring of the superficial. You saw my finger moving along there, freeing it of all adhesions.

This animal has a tourniquet on it. There is the area of fibrosis. We are replacing the layer of fascia, that takes the place of the mesotendon. I feel that this more or less time-consuming and tedious closure is well worthwhile because first intention healing and freedom from adhesions, and so forth, or freedom from extensive cellulitis is very important. I do

not see how the operation can possibly be a success when it is accompanied by granulation and second intention healing.

These are vertical mattress sutures I am putting in this horse, of about No. 2 silk. The idea is to get your relations on the skin. In an incision of this size, sometimes if you start at one end and go to the other, you will have a quarter of an inch more skin on one side of the incision than on the other. That is a simple whipstitch. The stiches are not over an eighth of an inch apart.

The positioning of these tension buttons is dependent upon the area where we remove the most fibrosis and the type of closure that we got. Usually, we routinely put one just above the annular ligament, and one just about two inches below the proximal end of the incision.

This is a 4-inch Ace bandage over one sheet of cotton. That is more or less typical of the way they come off the table.

I feel that the aftercare in this type of surgery is just as important as the operation. Bit by bits, we have evolved a procedure whereby we reset that bandage at 48-hour intervals. We do reset the elastic bandage, the Ace bandage, morning or night, or whenever we deem that it is necessary, depending on how it tends to work down. You can get some awfully nasty pressure necrosis which invariably comes on the front of the cannon, where the fetlock begins to become apparent.

There is one recommendation that I have changed radically, and that is that we now ask at least six months from the operation, before the onset of real serious exercise. However, the animal is walked half an hour a day and at the end of two weeks is jogged, but no serious work for six months after the operation. Thank you. [Applause]

MODERATOR CHURCHILL: Thank you, Dr. Proctor.

I think we will reserve the questions you might have until after all the panelists have had an opportunity to present their viewpoint.

As I said earlier, Dr. Davidson, of course, was to appear on this panel, and he was to have had some slides depicting his technique concerning the same operation. We do not have those but Dr. Palmer, I understand, closely follows the procedure that Dr. Davidson uses. I will ask Dr. Palmer at this time to give his viewpoint.

DR. GEORGE M. PALMER: As the old Chinese proverb says, I hope I will not have to give 10,000 words for each slide because we will be here for the rest of the night, I guess.

About a year and one-half ago Dr. Davidson was in New York, and I went up to visit him and Dr. Reed when they per-

formed this operation on a couple of horses. Actually, it is essentially the same operation that has been described and shown to you by Dr. Proctor, but we did it in the standing position.

First we had better say here that good "prepping" technique is absolutely necessary. Dr. Proctor has also said that, without that, without asepsis, your chances of a good operation are practically nil. That absolutely has been proven. Of course, horses that had secondary healing, I think absolutely none of them got back to the races. So, you absolutely have to "prep" your horse correctly.

In the standing operation, as we call it, we use just a local block. I use Illocaine, using a double ring, starting about the middle of the tendon, depending on how far up your incision will have to go. Once in a while we use a tranquilizer, if we think the horse will need it. Then we make our incision along the posterior part of the tendon, and making the incision as long as necessary. I think perhaps you have gotten a wrong impression from looking at the pictures, that at all times the incision needs to be almost a foot long, or at least it appears that way. In some of the acute cases that you get, you will be able to work through a 4- or 5-inch incision. In the acute case, it is no more than opening up the tendon sheath and wiping out the material collected under the tendon sheaths and removing the superficial digital ring.

Really, there is not much that can be added to what Dr. Proctor has already said because essentially the operation is the same. Over a period of time I have changed my aftercare radically, since the operation first was evolved. You know, we all tend to put an animal back in training in ten days, or attempt to, if the incision is healed. We have more and more realized that that was wrong, even though the medical people advise us to do that. After observing a number of these cases, we have settled upon a much longer period of convalescence.

After I close the wound, very frequently I use, if I think it is feasible, a cast over the top of the wound itself, and at times will have a small hole at the bottom for draining. That sounds rather radical, putting a cast over such an extensive wound, but I think very often you will find that it will work very well. Of course, you have to watch it very closely. If you are getting some pressure against the cast, you will have no trouble; he is going to tell you about it. Then the cast should come off immediately. I leave the cast on for at least two weeks, remove the case at that time, and take out the sutures. Invariably, you will have a clean leg. The wound will heal good. The leg will appear almost straight, that is, in the acute cases. In the chronic cases, as described by Dr. Proctor, you will have a little more healing to take place.

After removing the cast, recently, within the last six months, I have been putting them in a stall, and making the horse stay inactive for two months; absolutely no exercise, just stall rest. After that period of time, I allow the horse to be turned out with light training, very slow gallop, for about a month, and then back into training. Some of these people have their own way of postcare. I had one man, for instance, use this horse as a pony after that period of convalescence in the stall. This horse came out very well with that regulated care. Another fellow used his horse all winter as a hunting horse. That horse came out very well. Still, in both cases, very moderate exercise compared to what we had to do with him on the race track.

I think what we have learned out of this operation, more than any other things, is that firing and blistering are the worst things we can do for bowed tendons, especially firing. In some of the surgery for chronic bows, you can actually see where the point was causing adhesions from the skin into the tendon itself, absolutely defeating anything that the tendon was supposed to do. Blistering has the same effect, as we well know. It sets up a great amount of scar tissue around the peritendinous area. I absolutely will not allow any hot medications whatsoever to be used on the leg, after the operation.

I have been trying to think what Dr. Daidson might have to add, but I do not believe there is anything else, other than that I believe the tourniquet, in the standing position, is really not feasible, because the horse becomes very uncomfortable with the tourniquet, after about fifteen or twenty minutes. Really, it hampers you more than it helps you. Another thing, as Dr. Reed stated yesterday, in tying off your bleeders, it makes it a lot easier to get them right away. I think that is all. [Applause]

MODERATOR CHURCHILL: Thank you, George.

I am not personally acquainted with Dr. O'Connor's technique. I will ask him to state his handling of the subject, and his observations.

DR. JAMES T. O'CONNOR: First of all, my first-hand information of this operation came from the boys on the back-side. After inquiring, I did get the technique that these gentlemen have described. Dr. Reed came to New England to operate on a farm, and I was supposed to be there. However, I could not make it. I was not informed as to time, and it meant quite a few miles, so I did not get there. I missed it. But when I spoke to the other veterinarians that were there, they told me the technique that was used, which was the severing of the ring of the superficial flexor. Well, I inquired as to what it did and

tried to figure it out. They told me about this horse and that horse and that everything was fine.

We had an animal in New England called "Smoked Ham" or "Boiled Ham", some kind of ham. [Laughter] It was on a Friday when I happened to see him. [Laughter] I heard the good reports on this horse. Incidentally, I do not know who performed the surgery on him. But when I walked by the back-side, I noticed he was in a whirlpool, and quite a few other pieces of equipment were working on him. I understand he was a quality type animal, a classy old animal. They put him in a \$2,000 race, and he broke the bank. That was the bank that broke my back. Everyone from then on wanted the job done. Well, you could not buy a bowed horse for \$500 that you could have gotten for \$50 two days before. The thing began to sweep, and it swept.

We track veterinarians in New England were forced into it, with very little knowledge of Dr. Proctor's work. Incidentally, this is the first time that I had the good fortune to see these pictures. I enjoyed the technique. I wish I had seen them before I met "Smoked Ham." [Laughter]

The first animal that I wrested up enough nerve to do was a rather belligerent creature. Not doing much of my surgery down, I said, "Well, this nice, new tranquilizer"—I won't use the name—"is going to do the job for me." I figured I would use my blocks. An old assistant told me the dose, and I had it in my head. It happened to be one of the tranquilizers that worked the other way.

It was a Saturday afternoon at Rockingham, and the crowd was pretty thick, and I figured, "I have to get home early tonight, to beat this mob, or I will be here forever." They were pressing me. I said to this fellow, "It will only take about twenty minutes. We will get it done, and I will go home." I was going to slit the ring, and then go home.

I gave the tranquilizer intravenously, and did it rapidly, with not too much effect. I watched him; he backed up and came right through the webbing. [Laughter] Well, that messed up some of my tools that were boiling. He was making so much of a racket, they were coming out of every tack stall, wondering what the racket was. They thought someone was dying somewhere.

To make that story real short, I got him down. I didn't get him down; he went down. [Laughter] I got the thing done, and got him up, and I figured, "I will depend on antibiotics for this aftercare." [Laughter] That was my initial one. Then I went home and I got mad. I dug up Sisson's, and I went through it all. I said, "Maybe, I will catch another one." Sure

enough, here comes another one. From that time I changed the technique.

I will tell you the technique as I changed it, and then I will tell you the finished technique. First of all, no one technique will take care of every condition we get on the race track. I still do not know what the definition of a bowed tendon is.

So, to minimize all the labor and try to get it done between the dinner hour and scratch time, I dug up one of the Couvalt spray hooks. I did not enjoy cutting that annular volar band. I thought maybe it was going to be weakening. I devised the idea where I just used the block. I forgot about the tranquilizer; it scared me too much. I just used my old-fashioned block, as Dr. Proctor did, both sides, and I flexed it and went to work, making the incision just off the center line, and just about the level of the ring, a little higher, probably. When I opened it, I would flex it, and snake down, get a hook on the ring, and slide a groove directly into it, give it a rip, and that was it. That did not seem too bad but we thought we had to better that. I went on and on. I modified it by taking the whole ring out. From the whole ring, I began to suspect something else was wrong. I was not getting the results. I went higher on the leg, still using the hook, if I needed the ring. I found I had terrific adhesions between the two tendons, which was not what I wanted. I figured at the time that, if I could separate them, I would be all set. Then I devised a shoehorn affair that was nothing more than a Swedish bone chisel, rounded off; it was grooved.

When I made the bottom incision, did my ring, rather than taking the chance of ripping up—this is all in the standing position—I just slide that shoehorn up between the two, separating them all the way to the top as far as the thing would go. It was a good, long, regular bone chisel. I did get results, I thought, on selected cases of that type.

As the results grew, so did the clients. They were bringing in material that just could not be done in the standing position. So I said, "No, I won't do any more race track standing tendons." We brought them back to the farm; it was not my farm; I had access to it.

Then I laid them down and opened them up, as you saw here today. I was never so amazed to see the pathology in a tendon as I saw when I got into some of those things. The ones that I put down were so bad; whether it was because I did not select them properly, or I was greedy or what, or they were pressing me too hard, I do not know. I was getting terrific inflammation between the tendons, when I finished.

So I then went on to an injection, just before I made my last skin incision, of a metobiotic, I think it is called, a combination of sulfa drug with a steroid. I went up between those two tendons, after I got all the separation, and cleaned out all the debris and laid that in there.

Incidentally, all through this procedure, I was using stainless steel wire. I was using fascial ties, as Dr. Proctor did, using No. 2 chromic, and I was using mattress reenforcement stitches, surfacely.

The preliminary work was done with pHisoHex and scrubbed with soap and water, and soap and water on my hands, too.

I had to change the anesthetic, as I was getting into trouble. I do not have a table in New England, and I had to do it under semi-barnyard conditions. I do not put ropes on these animals. So, my anesthetic had to be changed. I stopped the tranquilizer, even any of the good ones, for the simple reason that, under this type of procedure, where you have no restraint, they do not come up fast enough for me. So I made it a practice of injecting 50 cc. of mephenesin intravenously, waiting about twenty-five or thirty minutes, and then using 7 per cent straight chloral a foam-padded hood on the animal for safety sake, and a man on the twitch, with myself giving the intravenous with a 20 gauge 1-inch needle. That is as high as I can hold it; give the anesthetic, with one man just bracing the back. We would set them in the corner, roll them over, and get them done that way.

For aftercare, we used the so-called Ace bandage, with no surface powder, or anything of that sort on the stainless steel, except a streak of that same grease that we used inside. The bandage was changed daily. The bandage was kept under compression for ten days. At that time, all stitches were removed. Then for two days the stitch line was just touched with tincture of iodine to dry up any pinpoints of blood seeping from the pulling of stitches.

Then we put on a regular Castex cast made by Bauer and Black, I believe. We left this on for six weeks. Once the cast was put on, after the ten days, this animal was walked daily, twice a day. My big trouble was as soon as the cast came off, the owner was back and the trainer was back and they said, "When is he ready? When is he going?" He went back to make room for another one to come in. They took them back too fast, for one thing. We had that rest problem and that hurry-up problem. It did ruin all the work I did, as far as I could see. I flatly refused to do any more, and I have not done one since. The last one ran off with the exercise boy in the morning.

Now I am going back to New England and devise a new technique. I am going to send them to Proctor. [Laughter and applause]

MODERATOR CHURCHILL: One of the main points of this discussion this afternoon is to try to bring us up to date, in so far as the results of this procedure are concerned. Dr. O'Connor has already expressed himself, I believe. [Laughter]

I would like to ask Dr. Proctor if he has any statement to make, either as to statistics on the number of operations he has done and the results he has had, or as to his opinion of the entire procedure as of now.

DR. PROCTOR: Well, there are three words that are applicable. I am disappointed; I am frustrated, but I am still fighting and hoping. [Laughter]

I am disappointed because the percentage of animals that have come back in and trained satisfactorily, or have raced, is about 20 per cent. It may be a little higher in the standard-bred. I had great hopes when we first started out.

I am frustrated because of the flat failures. Over half of them involved the good leg. Scientifically speaking, that is not a criticism of the operation but, practically speaking, it is. By the time a man has gone through six month of convalescence and spent a couple of thousand dollars getting the horse back to the races, and the first time they race him he bows his good leg, he is not going to go through that again, unless he has a good stake horse and in a glutton for punishment.

I frankly think my technique, my operative procedure, my sterility, all of those things, and the aftercare, are improving with each one that I do.

Fortunately, I have got two or three outstanding orthopedic surgeons who are conversant with the problems that we are faced with, and that are more than anxious to lend their help. And as Bill Reed said the other day, he is open to suggestions; in other words, I think this is a very real problem, and one where I do not know of anything worthwhile that has been evolved overnight.

Dr. O'Connor probably gave you the idea a moment ago that this thing was oversimplified. The original technique actually did not take into consideration the pathology that existed in the tendon. It was an attempt by certain folks to change over a technique that was proven of value in human medicine but which, in my opinion, actually had very little to do with the condition as it exists in the horse. We got off to an awfully bad start for that reason alone.

I think I know what a bowed tendon is. Like all definitions, it is not all inclusive. The bowed tendon I speak of is present in at least 75 per cent of the tendons that I have looked at and opened up, and it is a peritendinitis characterized by fibrous tissue formation. It has very little to do with the tendon itself and the mesotendon. The fascia is closely adhered, and the area of fibrosis may be anywhere from a sixteenth to a half inch thick. There is complete adhesion of everything from the suspensory ligament back into the flexor apparatus. There is no freedom of movement.

To do any good at all on these so-called big hambone bows, it is obvious you have to go in there and not only remove the adhesions and remove the fibrous tissue, but you have to make sure they do not recur. That is the frustrating part. I can get them out but I cannot keep them from recurring. Thank you. [Applause]

MODERATOR CHURCHILL: Dr. Palmer, would you please give us your opinion?

DR. PALMER: As of the moment, I think it is really unfair to the operation to try to state the percentage of individuals that have returned, inasmuch as the thinking has changed so radically within the last six to nine months as to the aftercare. Personally, I think the operation offers more than the routine treatment that we have used in the past. I believe that, if we can get the bowed tendon in the very early stages you really will be amazed at the percentage of horses that will get back and race, on their par value.

The old hambone tendon is another question. Actually what you are doing is just shooting at the moon and hoping. Those of us on the race track have a little advantage over Dr. Proctor in lots of ways, because we see the bow in an earlier stage and can come up with a good percentage of returnable, so that the operation will certainly fall into place and become a part of our repertoire, as far as surgery on the race track.

MODERATOR CHURCHILL: Do you have anything to add, Dr. O'Connor?

DR. O'CONNOR: No. [Laughter]

MODERATOR CHURCHILL: We have just a few minutes left. Do we have any questions from the floor?

DR. J. D. CHASSELS [Brampton, Ont., Can.]: George, do you take out any part of the annular ring? You did not say.

DR. PALMER: Oh, yes, the annular ring is removed completely. The operation actually, basically, is the same as Dr. Proctor does. Perhaps you thought the original incision was not as long as Dr. Proctor's. I believe the original incision should be

as long as the pathology in the tendon itself. For instance, if you feel you can get all the pathology out in the tendon within a 4- or 5-inch incision, that is all that is necessary, but I will run the incision up behind the knee, too, if I feel it is necessary to take that much of the adhesions out.

DR. CHASSELS: I would like to ask both you and Dr. Proctor, have you ever done two legs at the same time? What were your results?

DR. PALMER: I have done two legs at the same time, on two horses. One horse did not make it back to the races, the first horse I ever operated on. He was as big as a Percheron. He did not get back to racing, but the other horse did and raced successfully this year.

DR. PROCTOR: I have done several on both legs, and I have had horses that raced and horses that did not.

DR. CHASSELS: Did it all at once?

DR. PROCTOR: I do not think it is good policy. You have to leave them something to stand on, in front. It is like firing knees, shins and pasterns all at once, it is a bad deal for the horse. What is three weeks? You can repeat them with clear conscience in three weeks.

MODERATOR CHURCHILL: Any other questions?

DR. PROCTOR: I would like to tell about a case we had. I do not follow the races. It is only for that week or ten days that they are in Lexington, or the trots are in Lexington, which is only a ten-day period, that I get to see many brand new, honest-to-God, fresh bowed tendons. We did have one that occurred while this animal was in training. With the use of pregnesilone, locally, systemically, enzymes, large doses systemically, and ice boots continually for a seven-day period, night and day and, when they were not in the ice boot, walking, with cold water bandaging and ice water poured on it, two of the animals went on and raced successfully within a period of sixty days. I would certainly advise you gentlemen practicing on the race track that a routine like that is worth trying.

MODERATOR CHURCHILL: I think, too, a great many of us see these things to best advantage, and I know personally we can resurrect quite a few of these things by judicial treatment right in the very beginning.

DR. PROCTOR: I feel that a bowed tendon is simply an inflammation, and the fibrosis is a product of that inflammation. If you can reverse it by anti-inflammatory drugs and ice, you can prevent the thing from ever forming. In other words, the conception of a bowed tendon as being a group of fibers

pulled loose and torn, is not the case, I would say, in 75 to 80 per cent of the cases.

DR. BRENGLE: While the tendon is opened up, do you think a technique could be devised whereby you could inject pregesilone into the sheath?

DR. PROCTOR: No.

DR. BRENGLE: Not on the chronic ones but the brand new, acute ones.

DR. PROCTOR: No, but immediately after this happens there is that area of phlegmon or soft swelling. I think your pregnesilone should be instilled in the area that shows the greatest deviation from normal, not with the idea of aspirating but simply to instill. It need not be much, 50 mg. in $\frac{1}{4}$ cc. doses, that is 2 cc., four injections of $\frac{1}{4}$ cc. each.

MODERATOR CHURCHILL: I do not think Dr. Hansen of California is here, and I do not want to speak for Dr. Hansen and his treatment. But along your line of questioning, I know he has used successfully in the past injections of steroids all along the course of the tendon, small amounts- injecting as close to the tendon as possible, all up and down the entire area of inflammation. He has felt that he has derived quite some results from such treatment. I have seen some of the horses that have come East, that he has treated, and they looked very good.

OPEN FORUM

HOW THE AMERICAN ASSOCIATION OF EQUINE PRACTITIONERS CAN BEST SERVE

National Association of Racing Commissioners, by Mr. James H. Inglis; Association of Official Racing Chemist, by Y. T. Ouster, M.D., Ph.D.; Racing Stewards, by Mr. John F. Kennedy; Thoroughbred Racing Protective Bureau, Inc., by Mr. Robert A. Frink; Grayson Foundation Inc., by Mr. Clarkson Beard; Olympic Equestrian Team, by Joseph O'Dea, D.V.M.; Thoroughbred Club of America, by Horace N. Davis, D.V.M.

NATIONAL ASSOCIATION OF RACING COMMISSIONERS

MR. JAMES H. INGLIS

Gentlemen, it is a great pleasure to be back with you again. Before we adjourned for lunch, we heard a very interesting talk on the subject of sterility, which brought to mind a story that I heard recently about a couple that went to Europe. The wife was unable to have any children, so they consulted three of the outstanding specialists in Europe on the subject. After they had made all the tests, diagnoses, and so on, they were confronted with the problem of explaining to this unfortunate woman what her condition was. None of them spoke English very well.

So, the first one said, "Madam, the only way I can explain this to you is that you are simply unbearable." [Laughter]

The other one said, "Hans, that is not the right word. I speak English. I was in America once. I would like to explain." Then he said, "Madam, I have to tell you that you are just simply inconceivable." [Laughter]

Finally, the other doctor jumped in and he said, "Gentlemen, gentlemen, you are both wrong. Allow me to explain. Madam, you are impregnable." [Laughter]

Well, I am glad to be here to report to you on the progress of the Racing Chemistry Research Fund, with which I know you are familiar, and I am glad that I can give a favorable report on it.

The financing of the first year's work of the Research Fund is nearly complete, and one research project is already under way at the University of California, and another project is about to start at Columbia University in New York.

Our initial budget was set at \$50,000, and so far a total

of \$46,025 has been paid in. Nineteen of the twenty-four racing states have paid their quota. Also, unsolicited contributions, not included in the \$50,000 budgeted quotas for the racing states, have been received from the Province of Ontario, the Racing Commission of Mexico, and from the Horsemen's Benevolent and Protective Association.

The trustees of the fund include John Ring, Florida Commissioner and President of the N.A.S.R.C.; Dwight Murphy, Chairman of the California Horse Racing Board; Dr. Frank R. Menne, former N.A.S.R.C. president and a distinguished surgeon and pathologist from Portland, Oregon, who has recently moved to Wisconsin; Walter H. Donovan, a past president of the N.A.S.R.C. and well-known track executive; Allan M. Macleod, a former Massachusetts Commissioner and formerly an executive of the U.S.T.A.; Paul Serdar, the Illinois Commissioner; John Herculson, chief chemist for the Maryland Commission; Charles Morgan, chief chemist for the New York Commission, and myself as chairman.

It has taken more than three years to get this research effort off the ground. I do not intend to bore you with all of the details. Suffice it to say that we finally were able to convince the top racing association executives that the illegal tampering with horses, through the use of undetectable drugs, was a serious and urgent problem, and one that could threaten the integrity and future success of their business.

We had excellent and wholehearted cooperation and support right from the start from the United States Trotting Association, and from Mr. Gushen and the other top officials of the H.B.P.A. Since then, the T.R.A. has endorsed the Research Fund and urged their member tracks to contribute.

The results of research are always unpredictable, and there is no positive assurance that all the answers we seek will be forthcoming. But at least we can now face the public and truthfully say that everything possible that might be done, is being done to plug this one particular loophole in the regulation of the sport.

The subject of this panel this afternoon is "What Can the Equine Practitioners Do to Help the N.R.R.C.", or at least that is my phase of the problem.

I would say that there are several things, in addition to continuing to do the usual good job that the veterinarians do in keeping horses sound and healthy.

First, I would suggest that this organization could be of great assistance to the N.A.R.C. in helping us to draft a uniform corrupt practices rule, a rule which would, of course, include such subjects as a 48-hour rule against medication, if you

agree with some of us that that is a good rule. It would include, for example, the matter of horses that are nerved, and what type of nerving is permitted and what is not permitted. It would also include the matter of whether bleeders should be excluded from the forty-eight-hour rule or not, or whether they should not be allowed to race at all, and various other matters affecting corrupt practices, use of stimulants, and so on. Your help in the drafting of that rule would be welcome.

Another point that I would like to mention is that you could be of assistance to the Racing Chemistry Research Fund. If any of the practicing veterinarians at the race tracks have any knowledge that you think would be helpful to the research effort, we would be most happy to get it. If you have any knowledge of any drugs that have been used, that have not been detected, that should have been detected, or any other facts along that line, we would be glad to have the information. I would suggest that, if you have any information of that sort, you turn it over to Dr. Woodcock, who will turn it over to Mr. Morgan who is actually in charge of negotiating with the research scientists that are doing our work. Dr. Woodcock and Charlie Morgan are already working on one project in New York.

One other point that I think the veterinarians could be helpful to racing commissioners on is in the matter of sanitation. If anything comes to your attention in making your rounds, which you think is a serious matter in regard to general sanitation or health, I am sure you will find the racing commission in your particular area will welcome any such information or complaints, and that they will attempt to see that some action is taken on it.

Of course, our state appointed veterinarians also have that responsibility. Undoubtedly you have worked closely with them on that. Thank you very much. [Applause]

ASSOCIATION OF OFFICIAL RACING CHEMISTS

Y. T. OESTER, M.D., Ph.D.

It is a pleasure to be here this afternoon and to extend to you the greetings and good wishes of our association.

I thought my first duty ought to be to explain, possibly to some of you for the first time, what is the Association of Official Racing Chemists. Our association deals with the detection of drugs in racing animals. The word "Official" in our association has significance, because in our membership we include only chemists who are actively working in this field, not

chemists in the remote intellectual halls of universities or medical schools or veterinary schools. Actually, the members must be day-by-day working chemists, and officially appointed as such.

Admission to our association is not too simple a matter. Early in its organization, it was decided we must have some means of seeing that members who belonged to our association, even though they were officially appointed, had some competence in the field because the field is a complicated one, as most of you are aware.

At present, admission is by evaluation of an individual chemist's credentials. This means academic and his professional credentials. Probably one of the most important aspects is that he is given a set of samples containing drugs added by an official committee of our group, which he must analyze and come up with proper answers. So that there is a practical test involved, really, in naming the chemist as a member of our group.

Finally, each member annually is required—and a committee, again, is set up to do this—to list a number of drugs which he must detect in small quantities, each year. Each member, therefore, must carry out these. This is sort of an internal policing affair. The members do it themselves, but it is still a very effective method of keeping our chemists up to date.

Our organization is also an international one. We have members in Europe, Asia, Japan, Southwest Pacific area, and so on. It is really a truly international organization, and I believe encompasses most of the major racing areas in the world. There is a free exchange of information between members.

For instance, I just recently returned from a conference in Australia, called the Southwest Conference on Racing Chemistry. There people engaged in this work from Singapore, Siam, New Zealand and Australia gathered to consider their problems in detection of drugging. Free exchange was encountered. So, I think this will give you some idea of what our association is, and how it operates.

The second item I thought I might mention, and that is what the program, of course, is about this afternoon, how can you as practicing veterinarians be of help to us or, how can we be of help to you.

There are two areas where I thought our interests became mutual. First of all, the administration of drugs. You say, "Why does a chemist have any interest in the administration?" Not in the administration per se but, if he is giving the task of detecting drugs in horses, he is interested in how and why they were given. Secondly, in the actual detection of these drugs, our fields of interest cross.

Then you might ask, "Is a veterinarian interested in detecting the drugs themselves?" Yes, he should be. He should be sure that the chemist working with him knows what he is doing, and he should be able to supplement the chemist with information and details.

So that in both of these areas, that is the giving of drugs, in general and, secondly, detection of them, I think both of our organizations have mutual interest.

What I may say in the next few minutes, then, is directed primarily to those veterinarians, officials, in a sense, or designated by their racing authorities to aid in this program of drug detection, although, obviously, all veterinarians have an interest in it.

I first wanted to mention briefly this matter of sampling of biological specimens obtained from horses. There are four available materials that could be used: blood, sweat, saliva and urine. The first two, blood and sweat, are, for all practical purposes not used in any extensive way in the world today for drug detection. I do not have the time here to get into the details of why they are not used.

Saliva and urine are the primary biological fluids that are used for detection of drugs. Chemists recommend that the urine sample is the most important, or that more attention be given to this than to any other sample that may be taken. The reason is obvious, if you think about it for a moment. The urine in the bladder is sort of a store-house for discarded drugs. If drugs had been used or not used, and poured out of the body, this is the natural store-house or collecting depot for drugs. This does not take place in saliva. Here the drug is more of a passive substance, being in transit in the fluid of the saliva but not being stored. In an arguable sense, urine is a very important sample.

One or two items about the nature of the sample. The more sample one can get, the more drug one is going to have, in general. So, we would like to have a large sample. For practical purposes. One pint has been set as a more or less generally acceptable amount of sample. Secondly, the handling of this sample. Storage, I think, is an important aspect, so important that I am going to make particular mention of it here.

It should be stored carefully for two important reasons. One, in the effort to avoid tampering or contamination of this sample by illegal persons who should have no right of access to it; secondly, from the standpoint of the preservation of the sample. If a sample is stored in hot, humid air, it is likely to deteriorate, and even some drugs are likely to deteriorate. Certainly, the detection of drugs is much more difficult. So storage should be carefully done and under refrigeration, wherever

possible. This almost means in every case, because there is no place where it is absolutely impossible to get some kind of refrigeration storage.

The actual detection of drugs in the sample, then, is primarily the job of the chemist. Sometimes it is like looking for a needle in the haystack. Many well-known, prominent toxicologists have failed to properly, let us say, make themselves well enough acquainted with this field to properly identify and detect drugs. So, it is a very difficult procedure.

The final point I want to make is the relationship of the veterinarian to the chemist when a sample has been shown to have drugs present. First, of course, the veterinarian must be sure that this sample has not been tampered with in any way, or there is no possibility of having been tampered with until his agents deliver it to the laboratory. It is not the chemist's job to see that this sample is as perfect as it was when it left the horse. It is up to either the veterinarian or his appointed agent. So, the chain of evidence is a very important one, in cases of mutual interest, between the chemist and the veterinarian.

Secondly, when it comes to a hearing and discussion of the findings in a positive case, I think it is the duty of the veterinarian to be present and to testify, if necessary, concerning the effects of the drugs found in animals particularly in horses. Most chemists do not have information or are not qualified to discuss this point. I am in the unenviable position of having both pharmacological and medical background. In addition to giving chemical evidence, they expect a lot more from me in pharmacology or toxicology. The average chemist should not be expected to be designated as an expert in drugs. His job is the detection of these drugs.

The veterinarian in all cases should be qualified and, if he is not, he should make himself qualified in this way.

In my directions both to the veterinarian and the chemist, I would say, don't be afraid to say that you do not know a particular answer, when it is brought to your attention, in the case of a legal hearing. In very rare cases is your standing impaired by such admissions, because most of us do not know much about many things, and we should not try to say so; we should admit we do not know.

Finally, I should say the more contacts we could have between veterinarians and chemists, such as we are having today, which is a very limited way—I am up here talking and most of you are listening, at least not responding directly—the more contacts of this kind we can have, the better. I therefore put it in this phrase: get acquainted with your chemists, and I would

say the same to my chemists, get acquainted with the veterinarians. It is much easier to settle problems and avoid conflicts of opinion and statements, when you know the person with whom you are dealing.

As a final word to the veterinarians, who do not have a direct voice in the control of drugging, such as the official veterinarians do, I would say that your job could be to stick by the rules and regulations that are so well expressed by most of your racing commissions or racing authorities. If there is a forty-eight-hour rule in your area, it is important that you be aware of it, and that you be aware of all the ramifications of such rules. So that you can advise the horsemen and the horse owners. I have sat through many a hearing where there was a very serious admission on the part of the owner or trainer that he did not know the details of the rule. He will say, "Well, I listened to the veterinarian and he told me it was safe" or "it was O.K." He may really be passing the buck, and I think in most cases he was. If you have explained to him this rule, he cannot say that you told him to go ahead and that it was a safe procedure to use.

Thank you very much for this opportunity to talk to you.
[Applause]

RACING STEWARDS MR. JOHN F. KENNEDY

General Kester, Fellow Guests and Members: At the outset, I wish to thank your membership and Program Committee for inviting me here to participate in this afternoon's forum. It is especially pleasant to see so many friends here in attendance and to be able to renew many acquaintances.

A portion of the subject matter of this afternoon's forum deals with the relationship between the veterinarian practicing in the stable area at a thoroughbred racing meet and the board of stewards officiating at that meeting.

For the past several years, I have been a member of the board of stewards at the thoroughbred meetings conducted in the state of Michigan, specifically as the racing commission steward. Also served as steward at meetings in other states throughout the country. During this time I have come to know and respect the veterinarian practicing on the backside. As you all know, a racing meet has many facets, many functions, and many groups contribute to the operation: licensing, personnel, management, physical maintenance, policing just to name a few, as well as owners, trainers, riders, agents, stable help,

the public itself, veterinarians, officials. All at one time or other refer problems to the board of stewards, which is responsible for the conduct of the meeting. You know what that means. We are the ones that get the final blame.

Sometimes I think there should be a forum conducted somewhere by stewards.

I would here like to tell you briefly about a situation which arose in 1958 in Michigan, and which definitely illustrates how valuable the cooperation of the veterinarians can be to the stewards.

In the spring of 1958, prior to the opening of the 120-day thoroughbred racing season, Mr. Inglis, the Michigan Racing Commissioner, promulgated several changes in the rules of racing. Among these was the adoption of what is known and has been referred to by Dr. Oester as the 48-hour rule, which prohibits the giving of any internal medication to a horse for forty-eight hours prior to any race in which it may be entered.

As you can readily see, a rule of this type presents a problem of interpretation. When does external application become internal medication? How about coagulants? There were many questions.

We discussed the problem at length and finally arrived at what proved to be a happy solution. We asked Dr. F. Hugh Wilson, a very able veterinarian for the Michigan Racing Commission, to personally invite each of the seven or eight practitioners who had registered with the commission, to meet with us the morning of the day preceding the opening of the season.

This procedure had the approval of the Michigan Racing Commissioner. In fact, Mr. Inglis attended the meeting. It was not a short meeting. There was not always complete agreement because, being stewards, we said "No" several times. However, the end result was a series of interpretations whereby the practitioner knew what he could do and what he could not do under the rule.

Throughout the 120-day thoroughbred racing season in Michigan in 1958, we were not informed of a single violation of the 48-hour rule, which involved a practitioner. This, I say in gratitude, is an example of how the veterinarian may be of service to the racing stewards.

Please understand that my opinions here today are not to be construed as those of any organization, nor do I undertake to speak for all stewards. The thoughts are my own and are meant sincerely. Thank you. [Applause]

THOROUGHBRED RACING PROTECTIVE BUREAU,
INCORPORATED

MR. ROBERT A. FRINK

Thank you, General. Gentlemen, it is a pleasure to be here today.

Since this is the first appearance of a representative of our organization before your Association, I would like to take this opportunity, if I may, to review in brief the history of racing since the inception of the Thoroughbred Racing Protective Bureau. In this way perhaps I can best familiarize you with the activities and some of the accomplishments of the TRPB.

In 1945, the member tracks of TRA decided to set up the TRPB as its permanent investigative arm to thoroughly check on all allegations of corruption and irregularity in the sport. As head of the TRPB, officials of TRA selected Mr. Spencer J. Drayton, who continues this day to serve as our President. Mr. Drayton brought 14 years of investigative experience with the Federal Bureau of Investigation to his job. In addition to serving as administrative assistant to FBI Director J. Edgar Hoover, Drayton had also served as Special Agent in Charge of various field offices, including the key office here in Chicago. He was Vice-President of Grant Advertising, Inc. here in Chicago when Mr. Hoover recommended him for the position with TRPB. It is not strange in view of Mr. Drayton's background, therefore, to find that the present staff of TRPB investigators average 11 years investigative experience per man and years previous experience in the FBI.

I would now like to mention some of the current programs of the TRPB that are presently in effect.

In Mr. Drayton's first report to TRA members in December 1946, he recommended the adoption of a Code of Standards for member tracks which attested to the fact track management intended to clean house from within. This TRA code worked so well that at least one other sport is considering using it as a model. Comeback money, illegal wire services, bookmaking and other undesirable practices were specifically prohibited in the proposed code. The TRA code was adopted as recommended and perhaps more than any other single factor has contributed to the increased public confidence in thoroughbred racing.

The fingerprinting program inaugurated in 1946 helped racing to clean house swiftly and efficiently. It was the first time any such control had ever been set up in any sport. This project expelled from racing hundreds with serious criminal records. Once this program was initiated, scores of arsonists, narcotic addicts, fixers and hoodlums voluntarily left the sport fearing exposure.

The tattoo program which was set up in 1947 eliminated the ringer problem from racing. There has never been a ringer case involving a tattooed horse since the inception of the tattoo project. Prior to the institution of the tattoo program in 1946 there were 23 ringer cases.

The Special Report program was set up in 1949 as a control to prevent serious violators from returning to the sport after they had been suspended. Through this program, all racing commissions are kept currently informed concerning the complete backgrounds and records of these serious offenders against horse racing. Prior to this program many racing licensees had been permitted to return to the sport time after time. This program has removed from racing many bad actors who have no place in the business.

During the last year, 2,261 field investigations were conducted by the TRPB. These cover complete checks of every allegation or rumor of dishonesty in racing. Where a violation existed, the facts were furnished to proper racing or prosecuting officials. As a result of these investigations, it has been possible to prove that many of the rumors and allegations which are so prevalent in the sport are without foundation. Our investigations also serve as a deterrent to racing violations. Stimulations have decreased appreciably and attempts to fix races and other frauds have diminished over the years. In addition, practically every new owner applicant is completely investigated by TRPB agents and through these investigations many undesirables are prevented from participating in the sport.

TRPB supervision of track police and security functions is now conducted at 31 of the 41 TRA tracks. The supervision is in addition to the regular TRPB investigative activities. The purpose of this program is to co-ordinate the supervision of track police throughout the country so as to eliminate bookmakers from competing at tracks for business; to see that no hustlers or other undesirables interfere directly or indirectly with the comfort and enjoyment of the patrons; to insure that no known racketeers or hoodlums frequent the track to the detriment of racing; and to prevent any accidents from developing which will create disorder or harm to track patrons, racing participants, employees of the track, and the state.

The TRPB also has a continuing intelligence program in which it maintains close contact with law enforcement agencies and investigative organizations on a nationwide basis to develop general intelligence data on questionable persons in racing. The purpose of this program is to be sure that the TRPB files contain all derogatory data concerning any individual already in the sport or any attempting to enter the sport.

We are proud of the job the TRPB has done. It could not

have been done, however, without the wholehearted cooperation of member tracks, racing commissions and officials and of persons like yourselves who are deeply interested in the welfare and continued growth of thoroughbred racing.

GRAYSON FOUNDATION

MR. CLARKSON BEARD

I would like to make a few brief remarks regarding equine research with particular reference to the Grayson Foundation and the practicing veterinarian. Some basic facts must be considered first (1) less is known about the horse and why he functions as he does than any other domestic animal, and from the physical point of view we are asking a great deal of him. (2) The principal reason for this is that the horse dropped out of the economic life of the country as a draft horse and consequently from the large animal clinics. A lack of basic research naturally followed. In the past five years there has been an increase in clinic admissions, but of an entirely different sort; in racing and pleasure animals. (3) Racing from a sport of the few has grown into an industry for many. This growth has been great in the past twenty years and as you would expect there have been growing pains in all its aspects.

It is time now for the horse industry to come of age, and one aspect of this is an adequate and realistic research program. This will have to be financed largely by the industry, it must be directed for the good of the whole industry and it must be intelligently coordinated.

Grayson's Foundation's part in this picture

The foundation was set up and organized for just this job with a broad charter to include collection of funds from practically any source, to make grants for the research and to disseminate that information. The only limitation is that it must be in the equine field.

There have been faults with the foundation's operations. This is not meant as a criticism, but as a review in order to see what changes should be made to meet changing conditions. (1) Projects have been basic and for the most part in the infectious disease field. These are fine and should be done, but it has lacked balance and has left a void in work that has been needed by the practicing veterinarian (2) the direction has been on a part-time basis of busy men both from the administrative and to a certain extent scientific point of view. (3) the fund raising has not been on a broad basis nor has it had any real continuity. This has been reflected in the lack of a well rounded program and the necessity of dropping projects before completion. (4) There has been a lack of flexibility to meet changing conditions and the more practical needs of the industry.

To correct this I am planning to spend most of my time and effort to get this rolling and to coordinate the various efforts. There is increasing evidence that more and more people are realizing this need and with their financial and moral support it can be done. The finance must be based on a continuity of funds and must be spread over as broad a base as possible. We must build from what we have and keep going up. The race tracks are the ones every one looks to for aid and we must have a program that can be shown to be of benefit to them. A large membership with reasonable dues can be built up into a sizable fund. States with an interest in racing from a tax point of view must be shown where they can help. This is of questionable dollar value and will take a lot of work. Coordination with other agencies, such as state supported schools and the Federal health program can go a long way toward holding down expenses and thereby getting more work done for less.

Those who put up the money must have a say in the program.

The practicing veterinarian can and should be a leader in this plan. After all the work done must be used in the field by him. He can help the fund raising by his genuine interest and support of the work. This has not been the case in the past few years and the operations of the foundation have been hurt by this. Already veterinarians have been added to the advisory board and more can be added if needed. Tell us what is needed most. Too often such requests are based on a particular problem to that individual in his practice at the moment. We need projects that will do the most good for the most people and we need results as quickly as possible. We are planning a questionnaire and I hope you will put a lot of thought on what you send in.

There has been in the past few years quite a bit of money spent by individuals or groups on problems that they were interested in particularly. This has been done without an overall plan, some of it duplication and therefore wasted. A lot can be done by correlating such work. The foundation would not control the funds in these cases but could help the whole cause in getting a specific job done. In many cases local conditions present problems which have to be dealt with on a co-operative basis. These situations must be met and handled as they come up for the benefit of the whole program.

I hope this approach to the problem will appeal to you and that you will give it your support, in this case not so much financial as moral. We want and have made provision for you to be a part of the work that is to be done, which can only be for your benefit along with every one else in the horse industry.

OLYMPIC EQUESTRIAN TEAM
DR. JOSEPH O'DEA

I am sure you are aware of the fact that once every four years the amateur athletes of the world gather for a contest, do-or-die contest, sort of a one-shot proposition. Of course, that is the Olympic games. Once every four years the athletes of the western hemisphere also meet and then, of course, an American game.

This next year, 1959, here in Chicago the Pan American Games will be held. As General Kester told you, prior to World War II, the Army Cavalry School and the officers from the Army did most of the riding, or all of the riding in the Olympic Game.

The equestrian event is divided into three forms: The first is the Dressage. The second is the Prix des Nations, a very, very severe test of a horse in a limited area. The third test, and the one that gives us the problem, of course, is the Three-Day Test. That is the test whereby one rider and one horse compete for three days; the first day being the Dressage. The second phase being cross-country, and the cross-country test is usually around twenty or twenty-two miles, very rugged. Then on the day after that the same horse and same rider, after spreading themselves over twenty-two miles of country and events have to come back into a very, very small stadium, in a very, very tight enclosure and negotiate a very, very tight obstacle course. The mortality rate in that sort of competition is very, very high.

Since World War II, as the General has told you, the matter of preparing a team has fallen to a civilian agency. Actually, no agency but a group of interested sportsmen, headed by Mr. Whitney Stone formed a committee, incorporated in the state of New York, received a charter from the United States government, and they have produced this organization which finances the team. They hire the coaches, and they do the work. The men who compete on the team, naturally, are all amateurs. They receive no remuneration for their work.

The matter of horses is very, very difficult. You would think in a country as big as the United States, there would be no problem, but to get a horse that is proper for international competition is very difficult. First of all, he has to have certain physical equipment. After that, he has to have several years of experience to really fit him to do the job. So we are now in a program where we get horses by any method we can, except stealing them. Some of our horses are on loan, a few are purchased by the team, and some are outright gifts to them.

Those horses, if they have the potential we think they

must have, are schooled and sent to Europe with our team. Our team competes in the summer and winter shows over there. They cannot get that type of competition here in America; they have to go to Europe to get the international type of competition which will fit them for Olympic type competition. This is not just a schooling game, of course, as the General also told you. It is an ambassadorial situation; it is good public relations for America. But to be the best public relations, of course, we have to have a team that can go and win and look good doing it.

With regard to our jumping them, our *Prix des Nations*, they have done the job, and they are the leading team in the world today. I say that without question of doubt.

Our Dressage prospects are excellent. We have to import some horses. We have some other native horses which have been developed. I think our showing in both the Pan American Games and in the Olympics in '60 in Rome will show that America can do the job with Dressage, too.

The big problem comes with the Three-Day Test. A part of that job is the problem of public relations. We have gotten a good start on that team. The team is going to train out of Santa Barbara, California, and at San Fernando. We have gotten good coaches to go out there and help. A year from now I will be a lot smarter with regard to just what our three-day team can do.

With this whole picture, there is this one problem that has been brought up, and that is the matter of the actual tests out here, the actual Pan American Games. We as a team are rather worried about the adverse publicity that might come about, not from our own team's exhibition but from some other countries that might come in and might not be quite as well prepared as they should be for the Three-Day Test. In other words, we have a situation where we are trying to push this phase in international competition. It is important that we do, to fill out the Olympic team.

We found out in Stockholm and Helsinki there are people who come to the Olympic Games not quite prepared to do the job, by reason of their own ability or their horse's ability. As a consequence, there are many injuries. There are certain magazines, by the same token, and certain newspapers who love to dwell on the macabre or gory details of anything of that sort.

For the last two years I have been answering letters from antivivisectionists and bide-a-wee homes explaining why these happen and what we are going to do to prevent them.

A committee of veterinarians has been formed here in Chicago, headed by Dr. Rosborough whom you heard yesterday,

who has been negotiating and working with the Pan American Committee. In the executive meeting this afternoon, after this meeting, Dr. John and I are going to ask the American Association of Equine Practitioners to let that committee become a committee of this group, and this group will actually be the people who will supply that service at the Pan American Games. A number of our group here have volunteered their services. With the wonderful cooperation we have gotten from veterinarians over the country before this, I am sure there will be others who will want to join, too. We do not know yet how many men we will need. The men who do volunteer and do come will be made official veterinarians for the Pan American Games. I am sure it will prove very, very interesting to them. I am sure, in turn, this Association will derive a tremendous amount of good publicity from their service to amateur sport.

If there is anybody interested in the games, or participating in the scope that I have outlined, I wish they would get in touch with John Rosborough or myself. That is about the story. I appreciate the opportunity to discuss it. [Applause]

HORSEMEN'S PROTECTIVE AND BENEVOLENT
ASSOCIATION

MR. JOHN A. MANFUSO

General and Gentlemen: I have two thoughts I want to leave with you today, but before getting to them I want to tell you what our organization is, that is the members of your Equine Association that are not familiar with thoroughbred racing. I am certain that those who are connected with our industry are well aware of our activity.

We are probably the largest organization representing horsemen in the thoroughbred racing industry. We number 16,000 members. To be frank with you, and brief, our real contribution to racing has been in upgrading the respectability of the industry. We have done that by what our name implies, "Benevolent and Protective." From the benevolent standpoint, we have distributed over the years of our existence, relatively a short period of time, where we are now in our second million dollars of benevolence. We have taken from the rolls of public charity the needy of racing. We have literally taken care of our own.

Protectively, we have operated to represent the horsemen, monetarily, in their endeavor to obtain an adequate or fair purse distribution. We have assumed the leadership in cleaning up the so-called backstretch, improving living conditions.

We have sponsored catastrophe, fire, disaster and wind-storm insurance policies, giving horsemen throughout the United

States, in the thoroughbred industry, a \$500,000 yearly coverage for horses who may be destroyed through fire or windstorm.

We have endeavored to upgrade the quality of our officials in the sponsorship of what we call the stewards' pool, which to date has received a tremendous amount of resistance from owners and the various racing commissioners, but we have I think, made an impression on the necessity of having officials of integrity, courage and competence. We have, we feel, made some progress along those lines.

As I said, right on down the line, our real contribution has been in upgrading the respectability of racing. But as to the two points I want to bring to you today, one affects us very seriously, and we feel that, to some extent, you can be of real help to us, and that is in leading the course to a realistic appraisal of what the stimulation of horses means.

I do not want to take too much of your time, but the stimulation rule was originally formulated to eliminate narcotics. There isn't any question that that was a sound and good purpose, and it was needed. It went from there to various stimulants of all kinds. Without any undue criticism, because this criticism has come directly from us on other occasions, the field was broadened, the approach was taken that you could not do anything in the way of stimulating horses, even to the use of other agents like procaine. The attitude was that we would catch people as soon as we could determine whether they were using these various agents, whatever they might be. I am a novice in this particular field as far as the stimulation of horses is concerned, but the fundamental principle was that we would catch somebody and have a lot of publicity, and we were really doing a good job by publicizing that this horse was hopped and that horse was hopped when, in reality, the word "hopped" was applied when it should not have been used. It went back to the narcotic situation.

I have particularly referred to procaine, and do not misunderstand me, I am not taking a position that procaine should or should not be used. My position has been that a realistic, sophisticated approach to this problem should be arrived at, and that the responsibility not rest solely with racing commissioners because, to a degree, they are not competent in this particular field. They must depend either on their chemists, whom they have depended on in the past, and they were in the position of employer-employee relationship, or on you veterinarians on whom they have not depended. I really think you should lead the way in the particular field.

As an illustration on procaine, it was not detectable for a period of time, and then all of a sudden it became detectable.

Everyone in racing knew it was being used. We had sixteen cases in West Virginia, thirteen cases some other place, seven or eight cases in Delaware, with all the unfavorable publicity that came to our industry.

Gentlemen, what harm did it do? It did not hurt the individual to any great extent but it really hurt our racing industry. It was a type of procedure that was not necessary. It was handled by people who actually were cognizant of what they were trying to accomplish in the way of a stimulation rule. The so-called 48-hour rule that my friend Jim Inglis spoke about, that was carried out to a degree several years ago by some of the commissioners, where they eliminated everything for forty-eight hours. You could not even put a brace on a horse. That is a ridiculous thing. They evidently thought they were dealing with a piece of machinery rather than with flesh and blood.

On that particular subject, we need your help. We know and every other person cognizant of the true facts of racing know that horses are being stimulated, or they are being improved in their ability, through some type of medication which is not detectable. There is no question about that.

Now, what should be used and what should not be used, we do not know. You gentlemen are better able to evaluate that situation than we are. As horsemen, we know that human beings receive oxygen; they receive alcohol; some of them receive procain or novocaine, while they are on the benches in an athletic contest. But, do not misunderstand me, again, we know we want to keep racing just as clean as it is possible to keep it. We also want rules and regulations that are realistic and practical rather than theoretical and impractical. We want rules that will protect the honest man in racing, rather than the present rule which now protects the dishonest man in racing, because he cannot be detected in his malpractice, and it prevents the honest man who wants to abide by the rules, from competing on an equitable basis.

The second thought I want to give to you is this: We have listened with interest for a number of years to your problems of research. Dr. Churchill made a splendid talk to the T.R.A. convention in California, and he brought out two points very effectively, as I recall them. One was that equine research was lacking in fundamental research and, secondly, it was lacking in a stabilized income program year in and year out to support this research.

We discussed this matter with our directors at our recent national meeting held in Baltimore, some ten days ago. I might tell you a story that occurred there. We have Dr. Graffagnino, an eminent surgeon from New Orleans, on our board and also have one of your members, Dr. George Rosenberger. In the

course of this discussion, they both felt the necessity for this research but, going back to their individual professions, they felt they should also have something to say in that regard.

Dr. Graffagnino said, "I am surprised at the physiological" or "pathological" or some logical "weakness in the veterinary profession. I had a horse that had an osselet. I got an opinion in New York that the osselet was caused by one situation. I went to Chicago and I got an opinion that it came from another situation. Then I go down to Louisville and I get a third opinion."

Of course, if you know George as well as I do, he could not take that. He said, "Wait a second. We in the veterinary profession have made many real contributions to human medicine in our research." Of course, they sparred a bit. I was chairman of the meeting and our time was limited and I said, "Gentlemen, we have an idea on research here that you are approving. If you can improve in equine research the ability of the stallion, and transfer that to the human being, my contribution will be well rewarded." [Laughter]

But the suggestion I have is this: There isn't any question that everyone should participate, to a degree, in equine research in our industry. I probably should have brought this suggestion to the Jockey Club Round Table but I am giving it to you for your thought and maybe your support. We will support it. That is that the registration of thoroughbreds be increased from \$20 to \$25, with \$5 of that registration allocated for research. There are 12,000 thoroughbreds registered each year. That would mean a set fund in the racing industry of \$60,000. If the thought could be carried to the harness industry, the standard-bred and the quarter-bred, it might even go further. Then, with other contributions, you would certainly have a yearly revenue for research.

Gentlemen, I want to congratulate you on the tremendous strides you have made in the relatively short time of the formation of your organization. I am certain you all realize that, individually, in this industry, maybe you might call it racing, you have relatively little weight. It is only through the creation of an organization, a national organization, that you can derive the prestige and strength required to do the job you have got to do and, also, to establish standards of procedure to correct the selfishness of your members, as well as the other selfish interests that might occur in racing.

I am certain that the entire thoroughbred industry will give you a great amount of support in your endeavors to upgrade the quality of prestige of thoroughbred racing. I am more than certain that the H.P.B.A. will always extend its complete cooperation in these endeavors to build the prestige of racing on the highest scale possible. [Applause]

THE THOROUGHBRED CLUB OF AMERICA

DR. HORACE N. DAVIS

President Kester, Fellow Members and Guests: There is a rather well-known household drug on the market that has as its slogan "Accept no substitutes." Gentlemen I am a substitute. Our good friend Dr. Fred Kingma of the Food and Drug Administration would say, "Since the product is a simple drug and in the U.S.P. (Pharmacopeia) it probably is an acceptable substitute." [Laughter]

I regret, along with you, that our good friend Dr. Davidson, unfortunately, was not able to be here.

Recently down in Kentucky, in one of the stables there, I understand there were two colored gentlemen having a little conversation on this subject, and one of them said, "That Dr. Davidson, is he still practicing?"

The other one said, "What's the matter with you? Don't you know he's not practicing any more? He knows how now." [Laughter]

Seriously, Dr. Davidson will shortly be back in practice we are glad to report. I know he regretted not being able to be here with you.

If I might for a moment, so to speak, pull off the white coveralls and put on the Kentucky hard boots, I would like to bring you greetings of the Thoroughbred Club. That Club is an organization originally instigated in 1934, now constituting some 800 horsemen in various capacities. There are a number of veterinarians as members, owners-trainers and others associated directly with the horse in other connections. They also have a number of affiliated organizations throughout the country, the total membership being well over 1,000.

What can the A.A.E.P. do to best serve those horsemen? You are their scientific advisers in the field of equine medicine, do not forget that. They come to you; they trust you. We can do a great deal, as veterinarians, to build our organization and the confidence that these people have, by not letting them down in their trust.

As Dr. McGee pointed out to you this morning, there is a problem that the horseman has very little control over but he is caused to suffer from, and that is the case of fillies at the racetrack who receive male hormone injections, and do frankly, in the opinion of the veterinarians, at least the majority of them on the farms, suffer therefrom, at least in their first year at breeding farm.

The promiscuous use of these hormones probably could well be omitted. Along the same line, I might offer the suggestion that it has come to our attention that certain stables routinely suture all fillies at the racetrack. I would be the first to agree that there are cases where this is indicated, and it is the proper thing to do.

The routine performance of the Caslick operation does not seem to be indicated. When you so advise the owner of a filly at the racetrack, I think you have done him a service, as well as the eventual prospective owner of that filly as a breeding animal.

The Thoroughbred Club directors have always been receptive to the suggestions and thoughts of those veterinarians that were brought in contact with them and I can assure you that their feeling extends to all veterinarians. The tremendous strides that this organization has made have brought it into prominence. If you can continue, as I know you will, in the direction that you have started, you will not have to worry about the power and the prestige that will come to you. I can assure you that this horsemen's organization will accept you on your own terms, if you will just stand on your own feet. I thank you. [Applause]



PROGRAM MEMBERSHIP DIRECTORY

CLARKSON BEARD

President of Grayson Foundation
1410 Versailles Road
Lexington, Kentucky

EDWIN A. CHURCHILL, V.M.D.

President of A.A.E.P.
Practitioner
Centreville, Maryland

DAVID W. CRISMAN, V.M.D.

Philadelphia, Pennsylvania

A. H. DAVIDSON, D.V.M.

Practitioner
Hagyard, Davidson, McGee
New Circle Road
Lexington, Kentucky

HORACE N. DAVIS, D.V.M.

Immediate Past-President of A.A.E.P.
Practitioner
Bluegrass Heights Farm
Lexington, Kentucky

D. D. DELAHANTY, D.V.M.

Professor of Surgery
Cornell University
Ithaca, New York

THOMAS E. DUNKIN, D.V.M.

Secretary-Treasurer of A.A.E.P.
Practitioner
Chicago, Illinois

ROBERT A. FRINK

Thoroughbred Racing Protective Bureau, Inc.
Chicago, Illinois

JAMES H. INGLIS

Commissioner of Racing, State of Michigan
Chairman of the Racing Chemistry Research Fund
1702 Cadillac Square Building
Detroit 26, Michigan

JACQUES JENNY, D.M.V.

Associate Professor of Veterinary Surgery
University of Pennsylvania
Philadelphia, Pennsylvania

JOHN F. KENNEDY

Steward Representing the Michigan State
Racing Commission at Thoroughbred Meetings
Official at New York Tracks
1702 Cadillac Square Building
Detroit 26, Michigan

WAYNE O. KESTER, Brigadier General, USAF (Ret'd)

President-Elect of A.A.E.P.
Immediate Past-President of A.V.M.A.
11502 West Colfax Avenue
Denver, Colorado

FRED J. KINGMA, D.V.M., M.S.

Veterinary Medical Branch
Bureau of Medicine
Food and Drug Administration
Department of Health, Education and Welfare
Washington, D. C.

WILLIAM R. McGEE, D.V.M.

Practitioner
Hagyard, Davidson, McGee
New Circle Road
Lexington, Kentucky

JAMES T. O'CONNER, V.M.D.

Practitioner
Wrentham, Massachusetts

JOSEPH O'DEA, D.V.M.

Practitioner
Avon, New York

Y. T. OESTER, M.D., Ph.D.

Professor of Pharmacology
Loyola, Chicago Biological Research Laboratory
Member Association of Official Racing Chemists

GEORGE M. PALMER, V.M.D.

Practitioner
Laurel, Maryland

D. L. PROCTOR, D.V.M.

Practitioner
Deltor Clinic
Lexington, Kentucky

CHARLES W. RAKER, D.V.M.

Professor of Veterinary Surgery
University of Pennsylvania
Philadelphia, Pennsylvania

R. E. REBRASSIER, D.V.M.

President American Veterinary Medical Association
Chairman Department of Parasitology
College of Veterinary Medicine
Ohio State University
Columbus, Ohio

WILLIAM O. REED, D.V.M.

Practitioner
Elmont, Long Island, and
Miami, Florida

J. P. ROSBOROUGH, D.V.M.

Practitioner
Wheaton, Illinois

V. SAURINO, Ph.D.

Associate Professor of Bacteriology
University of Miami
Coral Gables, Florida

M. L. SCOTT, D.V.M.

Executive Secretary-Treasurer
Practitioner
Akron, Ohio

CHARLES H. SNIDER, Colonel, USAF (VC), D.V.M., M.P.H.

Division of Veterinary Medicine
Walter Reed Army Institute of Research
Washington, D. C.

M. B. TIEGLAND, D.V.M.

Practitioner
Opa Locka, Florida

JOHN D. WHEAT, D.V.M.

Professor of Veterinary Medicine and Surgery
School of Veterinary Medicine
University of California
Davis, California

JORDON WOODCOCK, D.V.M.

Program Chairman, A.A.E.P.
New York State Racing Commission Veterinarian
and Practitioner
Rye, New York

